

100 XP



Introduction to analytics

3 minutes

Analytics encompasses emerging industry practices, such as data mining, big data analytics, machine learning, AI, and predictive analytics. It is a term that is used to describe the technical aspects of analytics that have predictive capabilities and can be used to solve business problems.

Analytics can transform raw data into an extensive collection of information that categorizes data to identify and analyze behavioral data and patterns. Organizations can use this information to analyze the current state of their operations and to predict future behavior and trends by asking "what-if" questions. Additionally, analytics can help with fraud detection, image recognition, sentiment analysis, overall general employee productivity, and it also often replaces cumbersome manual processes.

Consider the scenario where you ask an employee to determine the cause of a recent spike in sales. The employee might have to painstakingly inspect each sale, interview customers, talk to sales people, and examine market trends. Instead, you can use the Microsoft Power BI key influencers visual to use advanced analytics and possibly get an answer much faster. The visual is only as good as the data that you give it, so you'll still have to collect the data and organize it. The actual analytics, however, can be done for you or at least give you an excellent start.

By reducing manual work, advanced analytics is ultimately able to help organizations make better business decisions and create actionable and meaningful results.

Traditionally, data analysis was a complex task that was carried out by engineers. Today, data analysis is more accessible to, and understood by, many people within organizations, across all teams. Power BI is an exceptional tool for quickly pulling actionable insights from data. It allows you to build visuals and metrics for your data in reports and dashboards so that you and your users can analyze data insights at a high level and drill down into those insights for more detailed information.

In this module's scenario, you work for Tailwind Traders as a data analyst. You've been tasked with building reports and dashboards that will be used across the organization to help with crucial business decisions. For example, the Product team is interested in learning if specific products are not selling as well as others, the Sales team is focused on sales forecasts for the coming year, and the Warehouse team is interested in a general breakdown of how the warehousing and shipping locations are performing worldwide. For each of these teams, you

have to build and share unique reports and dashboards that display high-level insights and visuals that are developed by using advanced analytics.

The inherent functionality of Power BI will help you accomplish this task. You can develop quick insights and share them in reports and dashboards with different teams within the organization. The advanced analytics capabilities of Power BI will enable you to identify categories and trends, see how data changes over time, and much more. From this information, you can make predictive data models and, therefore, help your organization make more robust business decisions, plans, and forecasts.

This module outlines the advanced analytic capabilities of Power BI. By the end of this module, you will be able to:

- Explore statistical summary.
 - Identify outliers with Power BI visuals.
 - Group and bin data for analysis.
 - Apply clustering techniques.
 - Conduct time series analysis.
 - Use the Analyze feature.
 - Use advanced analytics custom visuals.
 - Review Quick insights.
 - Apply AI Insights.
-

Next unit: Explore statistical summary

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How are we doing? 

Explore statistical summary

6 minutes

Data is often intertwined with statistics because statistics are one way in which you can explore your data. Statistics show you the distribution of your data and help you to identify key takeaways and trends and determine whether outliers exist.

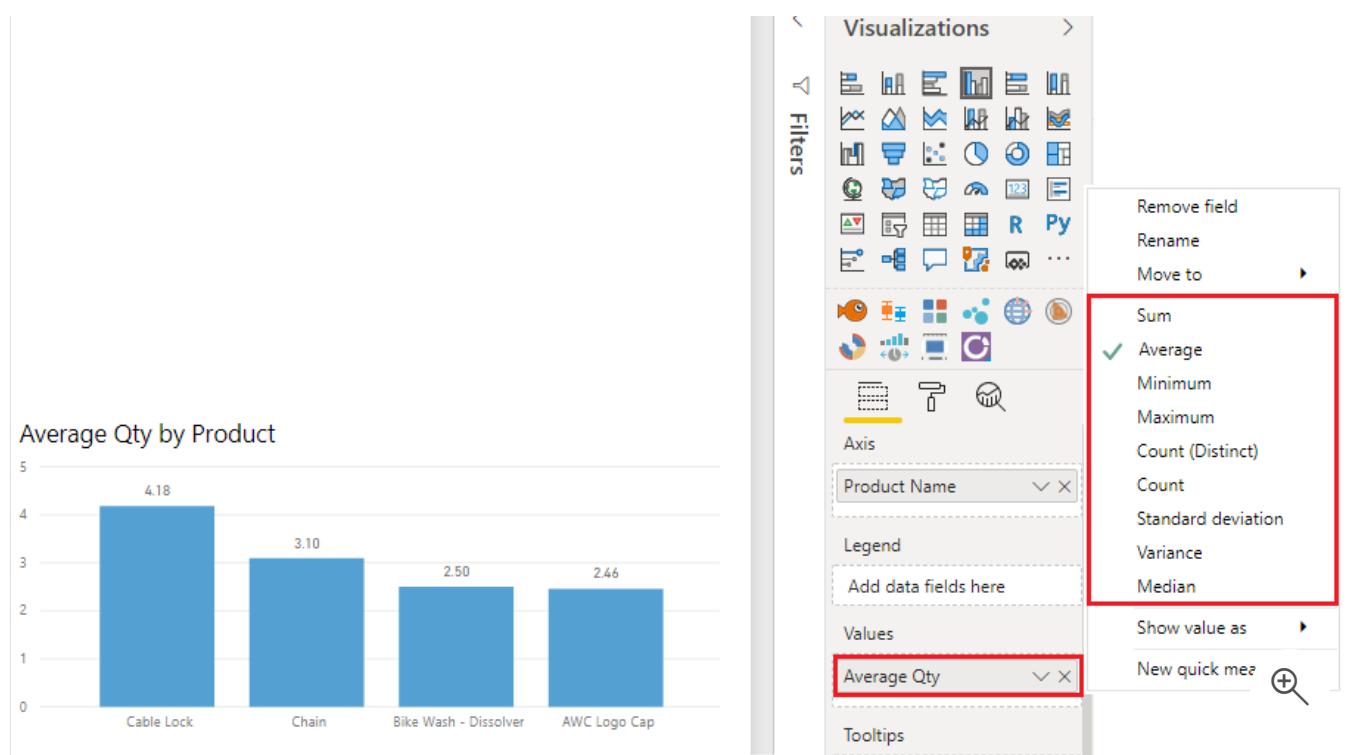
The statistical summary is the information that provides a quick and simple description of your data. Power BI has many functions that help you to conduct a statistical analysis, such as Data Analysis Expressions (DAX) functions, visuals such as histograms and bell curves, advanced analytics visuals, and statistical programming languages such as Python and R.

Exploring the statistical summary gives the user a high-level view of the available data, where they can see clusters, patterns on behavioral data, data averages, and more. They can gain insights about their data that will help drive business decisions.

For example, the Supply Chain team asks you to create a report that shows the frequency of orders for certain products and what the top 10 products are in terms of sales.

Statistical functions

Power BI Desktop has a number of DAX functions that you can use to get quick statistics based on your data. You can access these quick functions by right-clicking the **Values** field in the **Visualizations** pane, as illustrated in the following image.



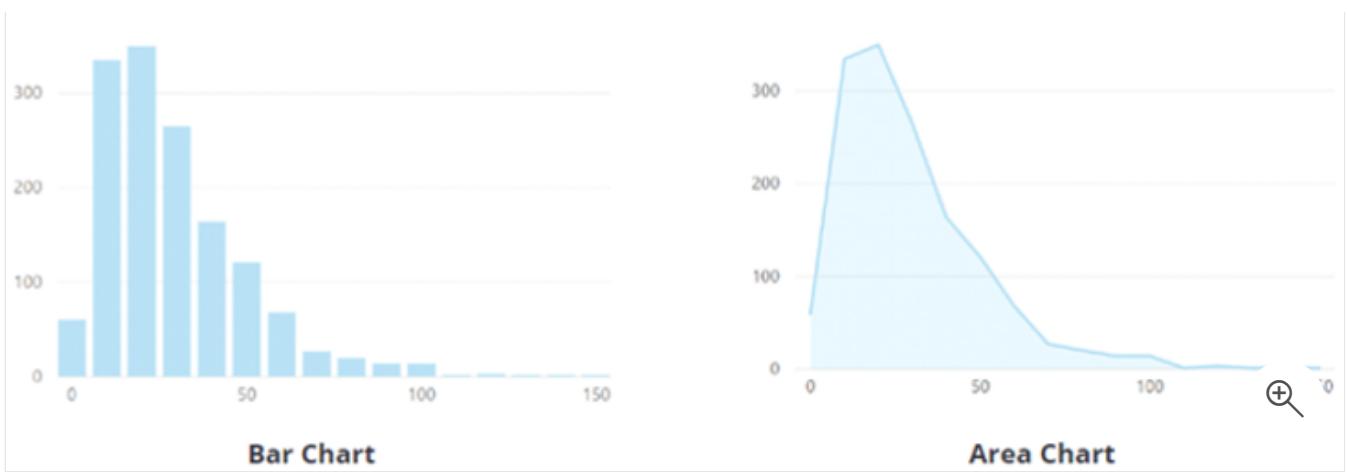
However, to avoid performance issues, it's better to create the statistical measures yourself by using DAX functions to calculate average, sum, min, max, and so on. For example, to analyze the inventory data to find the average order quantity for each product, you could use the following formula:

DAX

```
Average Qty =
AVERAGE ( Sales[Order Qty] )
```

Histogram

Histograms and bell curves are the most common way to display statistics about your datasets. In Power BI terms, you can represent a histogram with one of the bar or column chart visuals and represent a bell curve with an area chart visual, as illustrated in the following image. You can also use the Q&A visual to ask a direct question about the top or bottom items in a list.



A typical bar or column chart visual in Power BI relates two data points: a measure and a dimension. A histogram differs slightly from a standard bar chart in that it only visualizes a single data point.

In this example, you use the clustered column chart visual to present a histogram that determines the order quantities by order sizes.

You start by selecting the clustered column chart icon on the **Visualization** pane. Next, create a new grouping for the x-axis. You will learn more about grouping and binning later in this module, but they are useful in this context also.

To create the group, in the **Fields** pane, right-click the data field that you want to analyze and then select **New Group**. In this case, you use the **OrderQty** field. In the **Groups** window that displays, set up the bin group as follows:

1. Rename the group as **Order Bins (Buckets)**.
2. Set the **Group type** option to **Bin** and the **Bin Type** option to **Number of bins**.
3. Enter **5** as the **Bin count**, **1** as the **Min value**, and **44** as the **Max value**.

Name: Order Bins (Buckets) Field: OrderQty

Group type: Bin Min value: 1

Bin Type: Number of bins Max value: 44

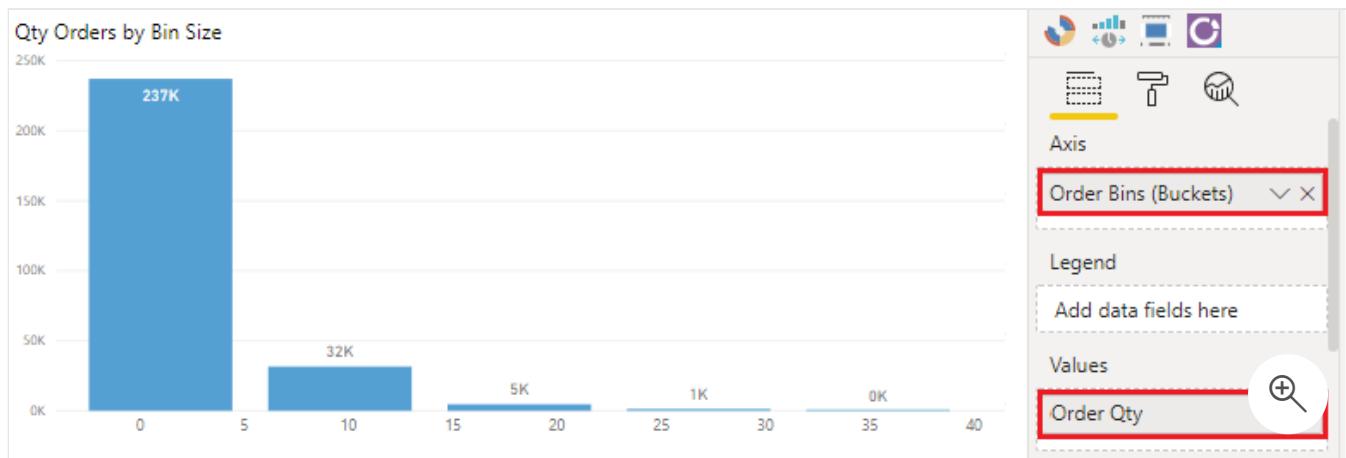
Binning splits numeric or date/time data by an amount you specify. The default bin count is calculated based on your data.

Bin count: 5 Bin size: 8.6

Reset to default **OK** **Cancel**

Next, populate the visual as follows:

1. Drag and drop the **OrderQty** field from the **Fields** pane into the **Value** field on the **Visualizations** pane.
2. Drag and drop the **Order Bins (Buckets)** group from the **Fields** pane into the **Axis** field on the **Visualizations** pane.



The visual now shows that the data is grouped into buckets on the x-axis, with the order quantities of that variable on the y-axis.

You have now produced a histogram that displays the order quantity (**OrderQty** field) by order size buckets for the Supply Chain team.

Top N analysis

The TOPN DAX function returns the top N rows of a specified table. The Top N analysis is a great way to present data that might be important, such as the top 10 selling products, top 10 performers in an organization, or top 10 customers. Alternatively, you can look at it from the

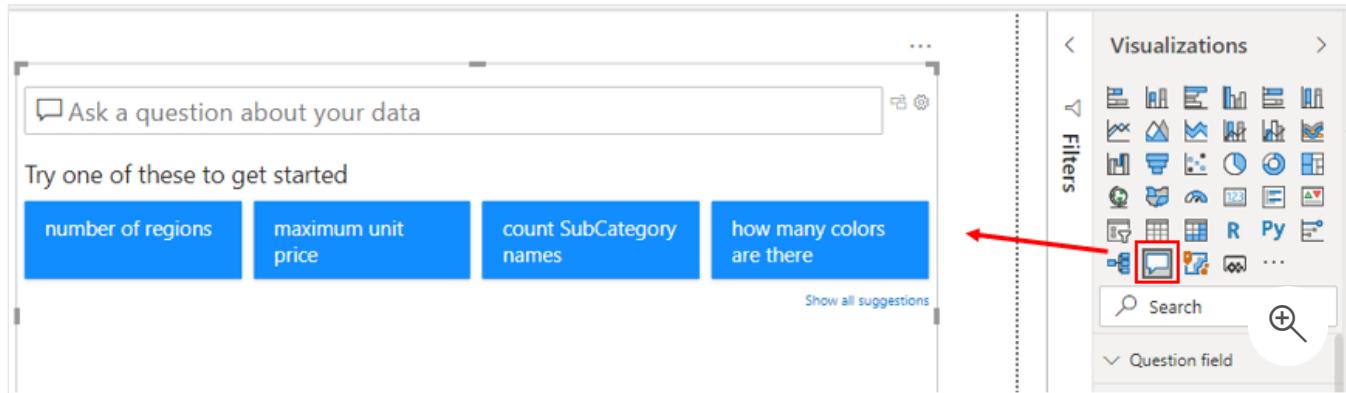
other perspective and present the bottom 10 items in a list, in other words, the worst performers. Depending on the requirements, you might want to use one or both of these options.

In this example, the Supply Chain team wants to know what the top 10 selling products are. You accomplish this task in one of three ways: by using a Q&A visual, using a Top N filter, or writing a DAX formula.

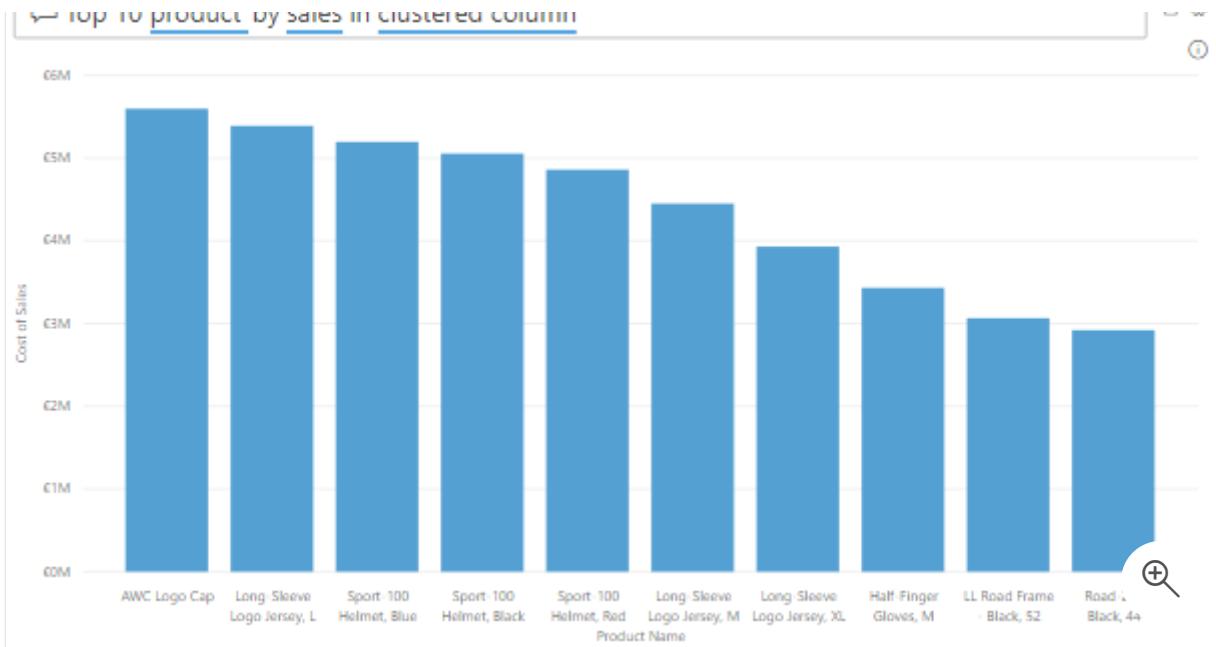
Use the Q&A visual to find the top N

You've created a report for the Supply Chain team, and now the team members have questions about various other views or insights that they are interested in. Power BI has a built-in Q&A visual that allows users to ask their own questions and get answers so you don't have to address each individual question. The Q&A visual is an effective tool because it allows users to quickly get answers about the data independently, which saves time for everyone involved. The Q&A visual is unique in that it does not require knowledge of Power BI to use the visual; users can ask their question and they, too, can create insightful visuals.

Add the Q&A visualization to your report, and then reposition the visual and customize its formatting, as required.

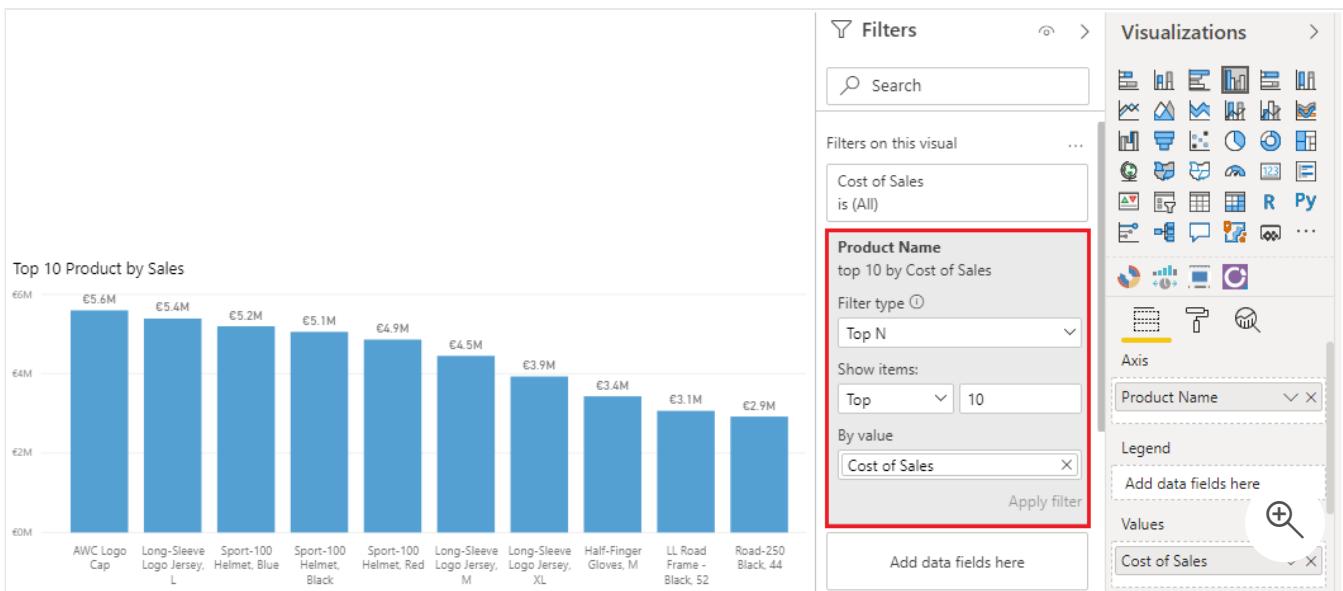


Now, you can use the visual to get answers. In this case, you want to know what the top 10 selling products are, so you enter a question such as, "What are my top 10 products by sales?" Power BI will automatically display those results for you.



Use a Top N filter type

Top N is a filtering option that is available on the **Filters** pane. Select the field that you want to analyze on your report page (in this example, it's the **Product Name** field). In the **Filters** pane, expand the **Filter type** list and select **Top N**. In the **Show items** settings, select **Top** and **10**. Then, select **Cost of Sales** as the value that you want to filter the field by. The visual updates accordingly.



Use a TOPN DAX function

You can also calculate your top 10 products in DAX by using the TOPN function. This option could be useful if you want to present the top 10 in a different context, such as how much of the top 10 best-selling products contributed toward the overall total sales.

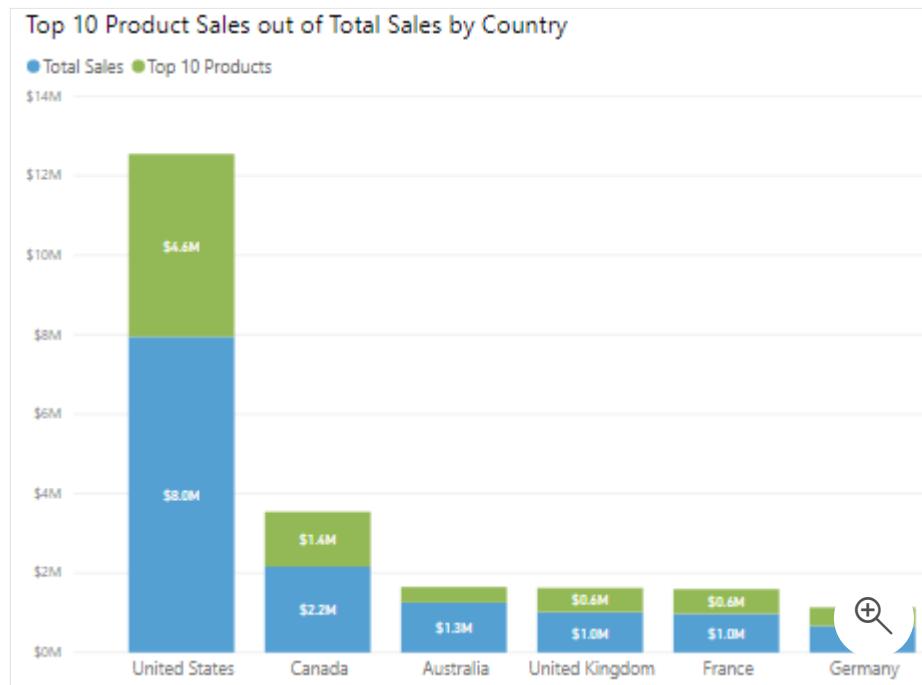
Start by creating a new measure called **Top 10 Products**. Then, use the TOPN function, along

with the SUMX function, to calculate your top 10 products by total sales, as follows:

DAX

```
Top 10 Products =  
SUMX ( TOPN ( 10, Product, Product[Total Sales]), [Total Sales] )
```

The following image shows the top 10 products versus total sales for comparison.



You can adjust the DAX formula to present the same result in percentages.

For more information about the statistical capabilities of Power BI, see [Statistical Functions - DAX](#).

Next unit: Identify outliers with Power BI visuals

[Continue >](#)

How are we doing? ★ ★ ★ ★ ★

100 XP



Identify outliers with Power BI visuals

3 minutes

An outlier is a type of anomaly in your data, something that you didn't expect or that surprised you, based on historical averages or results. You will want to identify outliers to isolate data points that significantly differ from other data points, and then take action to investigate the reasons for the differences. The results of this analysis can make a significant impact on business decision making.

Consider the scenario where you are analyzing data for a shipping warehouse. You notice that the number of orders increased above average for a specific product category. You first want to identify the product category. Then, you want to ask several questions about the outlier:

- Did above average shipments happen that day?
- Did this anomaly occur in a specific warehouse?
- Did a single event cause the increase in orders for that specific category?
- Did this event occur on other days in the last month, quarter, year, or prior year?

Power BI allows you to identify outliers in your data, but you need to first determine the logic behind what constitutes an outlier. You can use trigger points, such as calculations, around what you would consider the outlier to be.

The process of identifying outliers involves segmenting your data into two groups: one group is the outlier data and the other group is not. You could use calculated columns to identify outliers, but the results would be static until you refresh the data. A better way to identify outliers is to use a visualization or DAX formula because these methods will ensure that your results are dynamic.

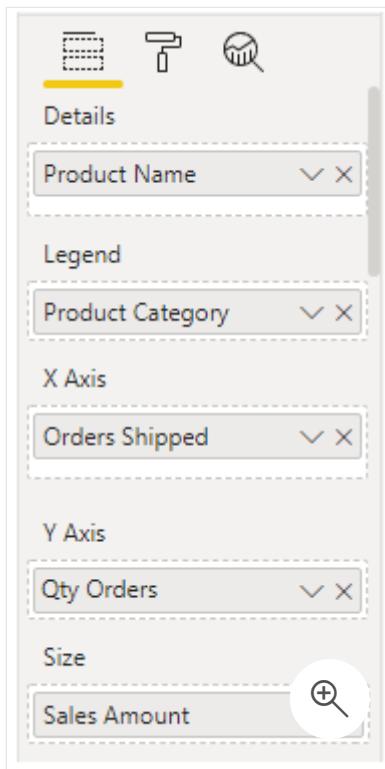
When you have identified the outliers in your data, you can then use slicers or filters to highlight those outliers. Additionally, you can add a legend to your visuals so that the outliers can be identified among the other data. You can then drill in to the outlier data for more detailed analysis.

Use a visual to identify outliers

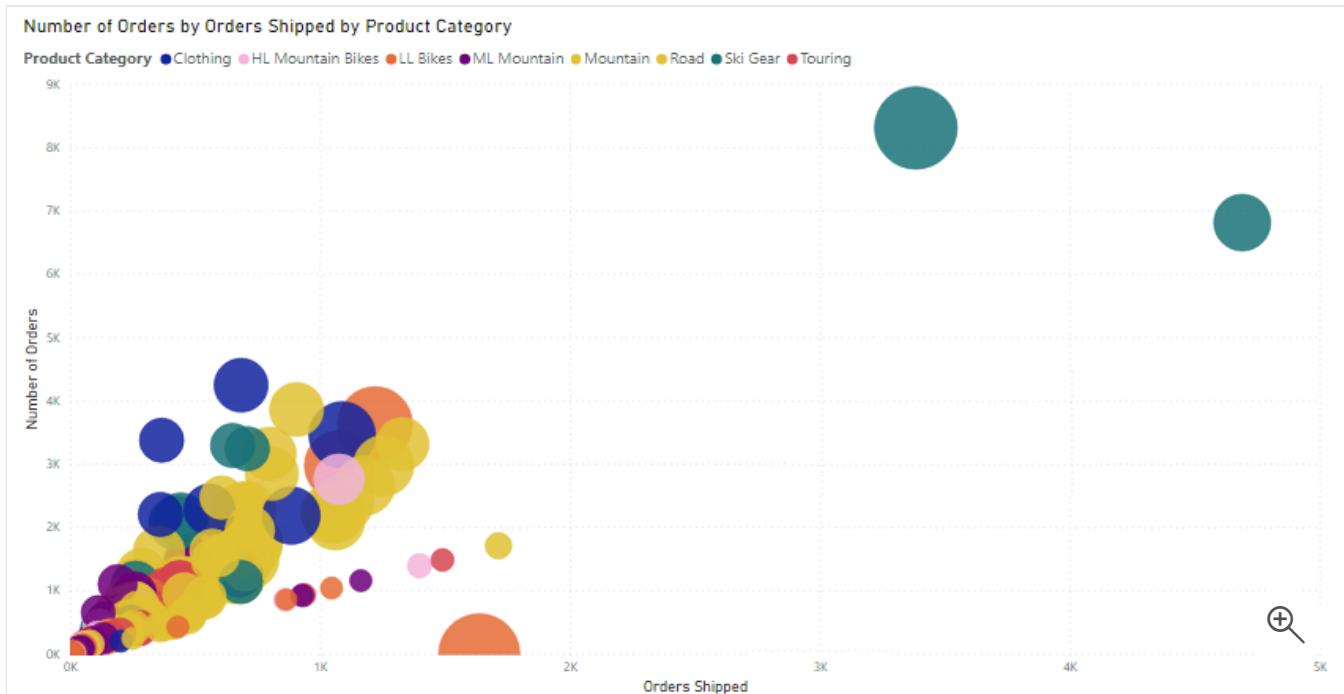
The best visual to use for identifying outliers is the scatter chart, which shows the relationship between two numerical values. Scatter charts display patterns in large sets of data and are,

therefore, ideal for displaying outliers.

When you add a scatter chart to your Power BI report, you put your fields of interest in the **X Axis** and **Y Axis** sections, respectively. In this case, the **Orders Shipped** field is on the x-axis, and the **Qty Orders** field is on the y-axis.



The visual will update to display the data according to the selected fields, and you'll be able to clearly identify the outliers in that data; they are the isolated items that are away from the bulk of the data.



Now that you can identify the outliers in your data, you can investigate the reasons for their existence and take corrective action.

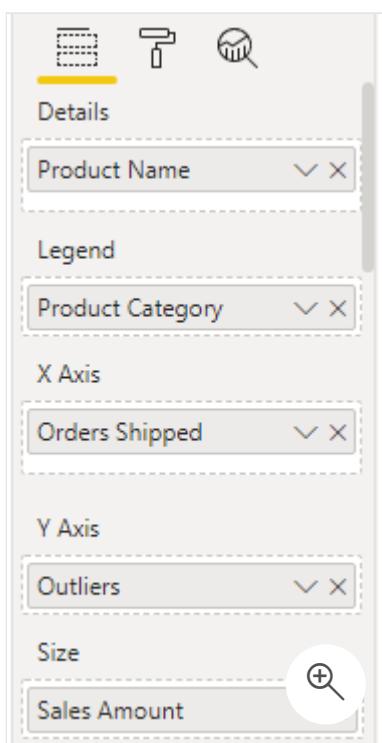
Use DAX to identify outliers

You can use DAX to create a measure that will identify the outliers in your data, such as in the following formula:

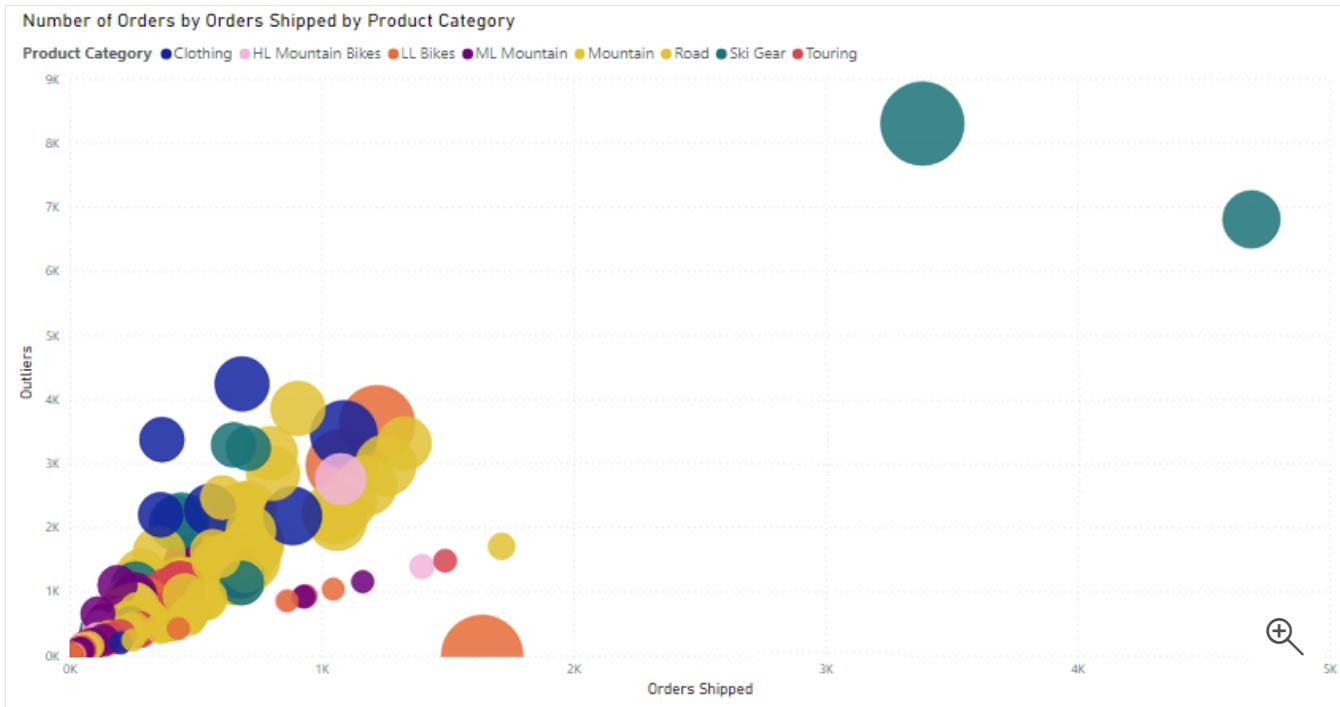
```
DAX  
  
Outliers =  
CALCULATE (  
    [Order Qty],  
    FILTER (  
        VALUES ( Product[Product Name] ),  
        COUNTROWS ( FILTER ( Sales, [Order Qty] >= [Min Qty] ) ) > 0  
    )  
)
```

Order Qty is a measure in the Sales table, and Min Qty refers to the lowest order quantity in the Sales table

When you have created a new outlier measure, you can group your products into categories by using the grouping feature, as you previously did when creating a histogram. You then need to add a scatter chart visual, as you did in the previous section, because this is the best visualization option for displaying outliers. When you've added the scatter chart, populate it with the fields that are associated with your DAX formula and outlier measure.



In the scatter chart, you'll be able to identify the outliers in your data. You can then investigate the reasons for their existence and take corrective action.



Next unit: Group and bin data for analysis

[Continue >](#)

How are we doing? ★ ★ ★ ★ ★

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Group and bin data for analysis

4 minutes

When you create visuals, Power BI Desktop aggregates your data into groups, based on the values that it finds in the underlying data. You can refine how those default groups are presented. You can also create new groups by grouping two or more data points in a visual or putting values into equal-sized groups (binning).

Grouping is used for categories of data. Binning is similar to grouping, but it is used for grouping continuous fields, such as numbers and dates.

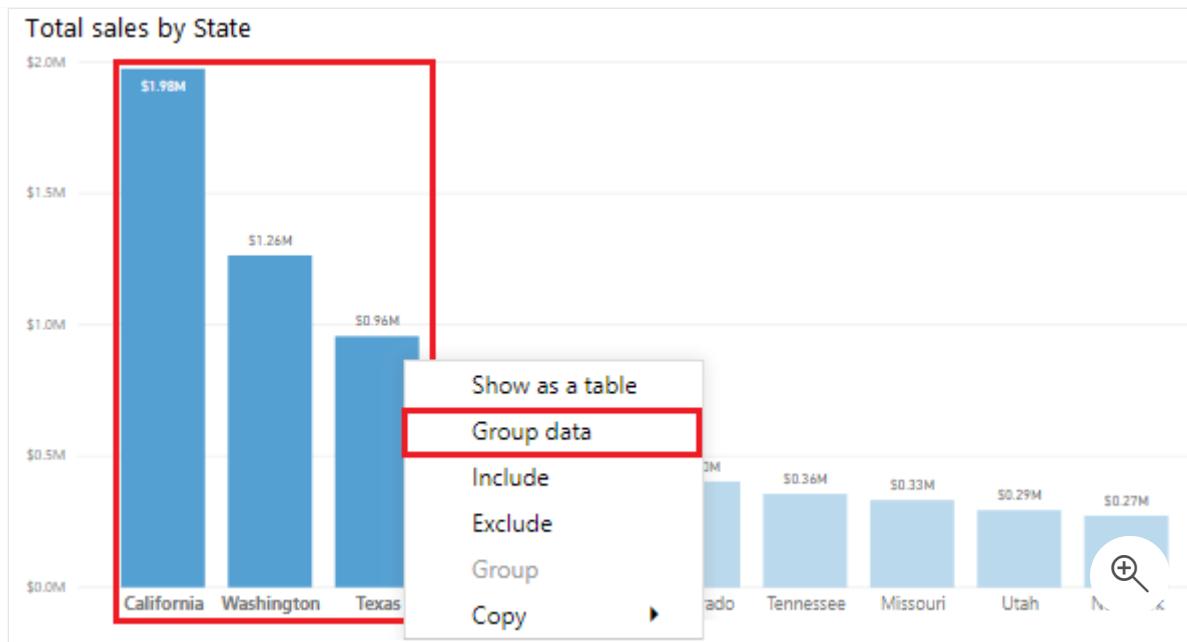
You can use the grouping and binning features to ensure that the visuals in your reports display your data according to your preference. Using these features will help you to clearly view, analyze, and explore the data and trends in your visuals. Additionally, you'll be able to identify clusters, patterns of behavior, data averages, and more. The results of this analysis will provide your users with more specific insights on their data, which can help drive business decisions.

In this example, the Customer Service team has returned to you, greatly impressed by the analysis that you have done. Now, they want you to further analyze their Help ticket data, asking if you can segment the data into different groups and clusters. In particular, they want to identify the cities with the highest sales.

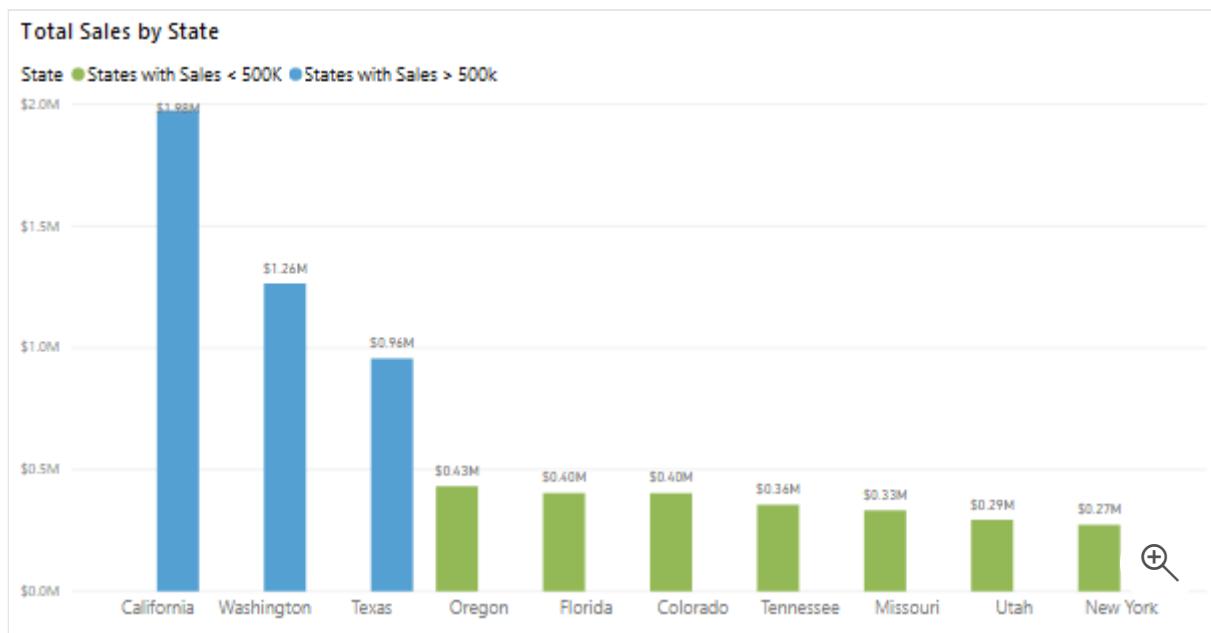
Create a group

The following image shows a bar chart in which Power BI has automatically segmented the data in the way that it found most useful: Total Sales by State. However, you want to group some of the bars (states) together so that you can view them as one category, which will help the Sales team identify the cities with the highest sales.

To create the group, use **Ctrl + click** to select the data points on the visual that you want to group. In this case, it's states with sales greater than 500,000 dollars. Right-click one of those selected data points and then select the **Group data** option.



When the group is created, notice that the visual updates to take into account the new group. The following image shows that the other states, which are the states with lower sales (less than 500,000 dollars) have been grouped together and are highlighted in a different shade.



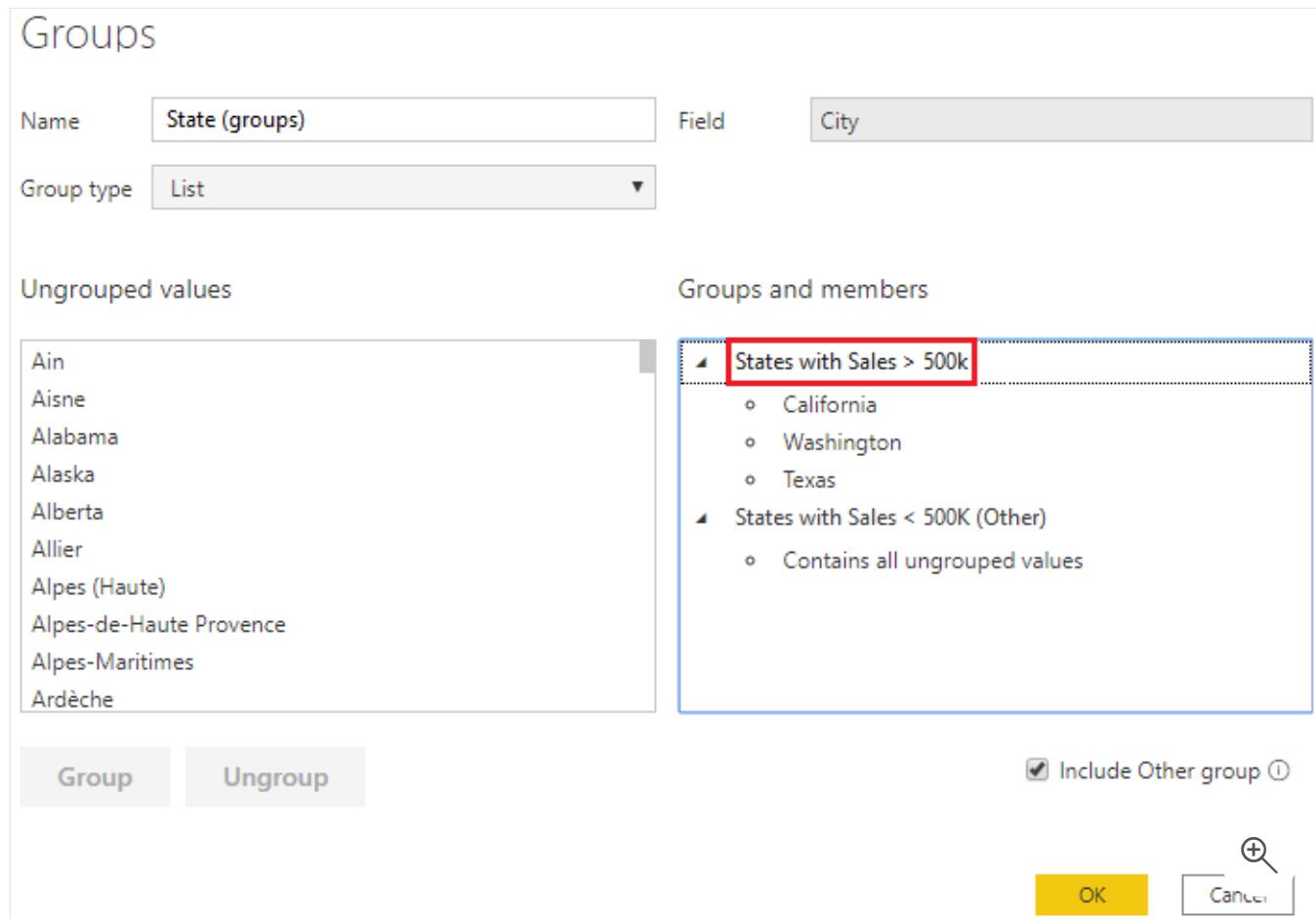
The new group field displays in the **Legend** bucket for the visual and is listed in the **Fields** pane.

When you create a group, you can change the way that the data is displayed in the visual. For example, you might want to switch the values in each axis. You can also use the group in any of the other visuals in your report. To do so, drag the group field from the **Fields** pane and then drop it into the visual in which you want to use it.

Edit a group

Continuing with the previous example, you now want to edit the categories that make up your group. Right-click the group field in either the **Legend** bucket or the **Fields** pane, and then select **Edit Groups**.

In the **Groups** window that displays is a list of the groups and the different items within those groups. The following image shows the **States with Sales > 500k** group and its members, along with the **Other** group (**States with Sales < 500k**) that contains all other values that have not been put into the first group. If you refresh your data, and new items appear in the ungrouped values list, they'll all go into the **Other** group.

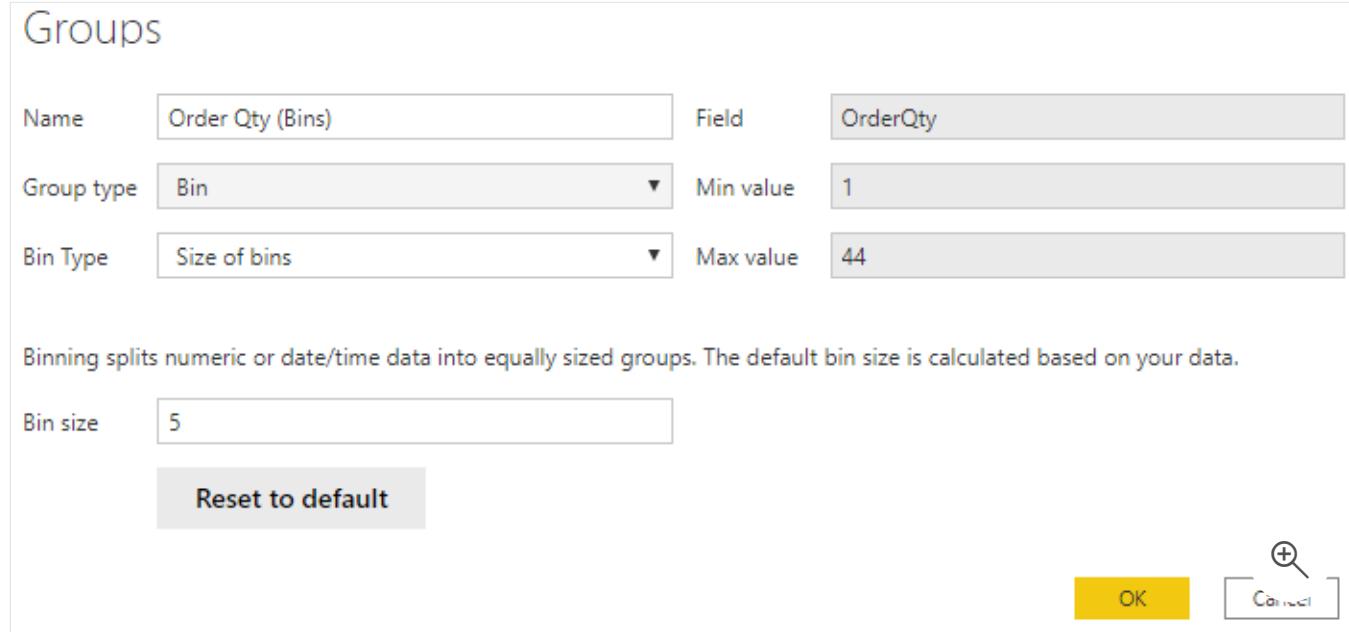


You can now make changes to the group. You can rename any group by double-clicking the group title in the **Groups and members** section and entering a new name. You can add ungrouped values into an existing group, remove values from an existing group, and create a new group.

Create bin groups

The process of binning allows you to group your numerical and time field data into "bins" of equal size. This approach allows you to visualize and identify trends in your data in more meaningful ways. Binning allows you to right-size the data that Power BI Desktop displays.

In this example, you want to create bins (groups) for the **Order Qty** field. Start in the **Fields** pane by right-clicking the **Order Qty** field that you want to create the bins for, and then select **New Group**. On the **Groups** window that displays, set the **Bin size** to the size that you want, adjust other settings as required, and then select **OK**.



When you have set up the bin group, you'll see a new field in the **Fields** pane with **(bins)** appended to its name. You can then drag that field onto the canvas to use the bin size in a visual.

Next unit: Apply clustering techniques

[Continue >](#)

How are we doing? ★ ★ ★ ★ ★

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Apply clustering techniques

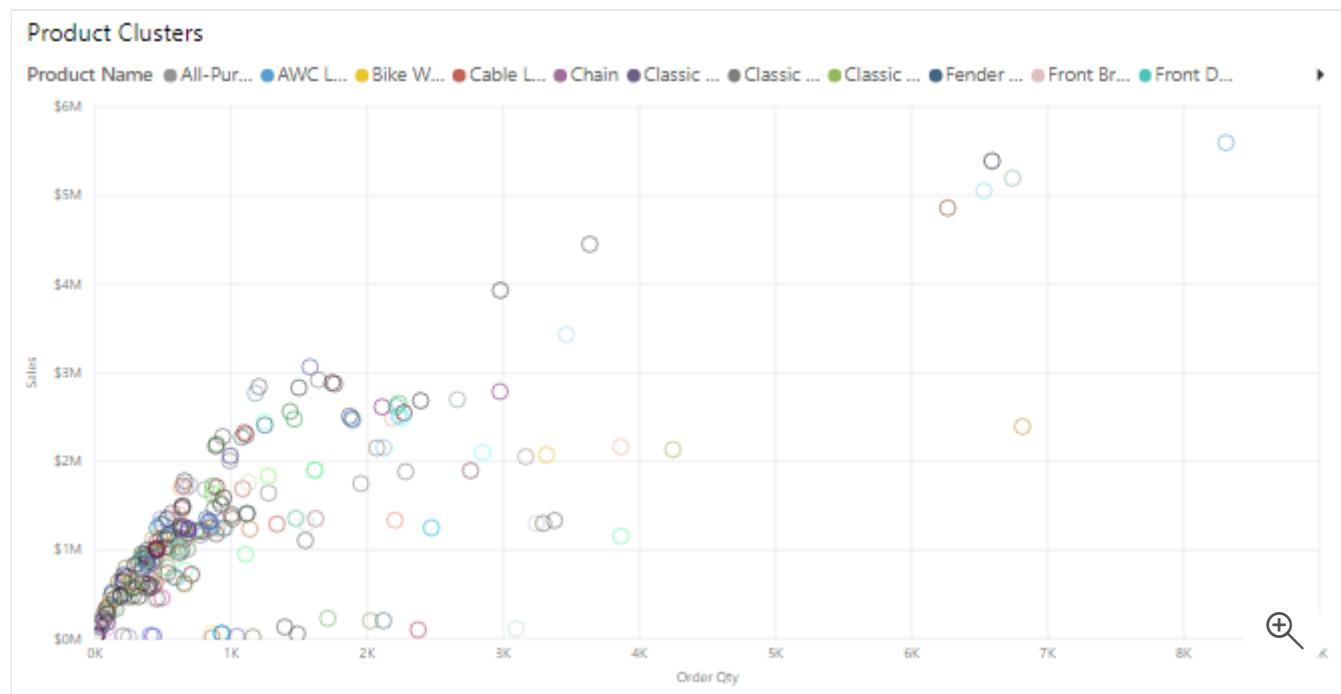
3 minutes

Clustering allows you to identify a segment (cluster) of data that is similar to each other but dissimilar to the rest of the data. The process of clustering is different to that of grouping, which you accomplished previously.

The Power BI clustering feature allows you to quickly find groups of similar data points in a subset of your data. It analyzes your dataset to identify similarities and dissimilarities in the attribute values, and then it separates the data that has similarities into a subset of the data. These subsets of data are referred to as clusters.

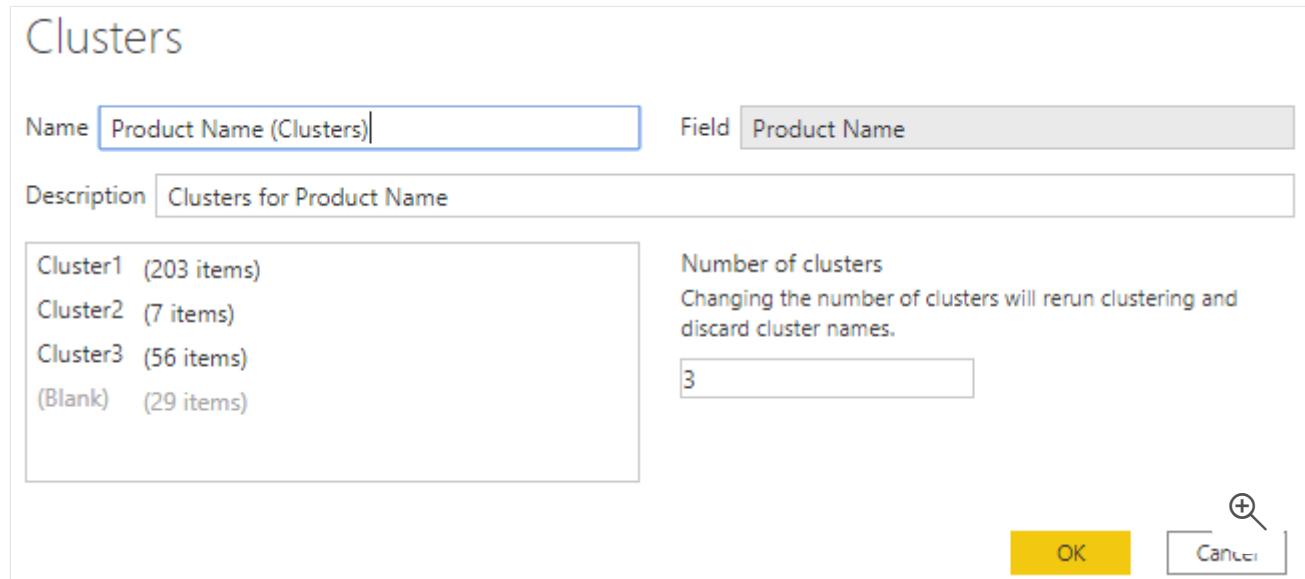
For example, you might want to look for patterns in your sales data, such as the behavior of customers overall. You can segment the customers into clusters according to their similarities, such as age or location.

Start by adding the scatter chart visualization to your report and then add the required fields to the visual. In this example, you will add the **Order Qty** field to the x-axis, the **Sales** field to the y-axis and **Unit Price** to the **Values** field. The following image shows considerable data in the scatter chart, so it is difficult to discern any natural groups.

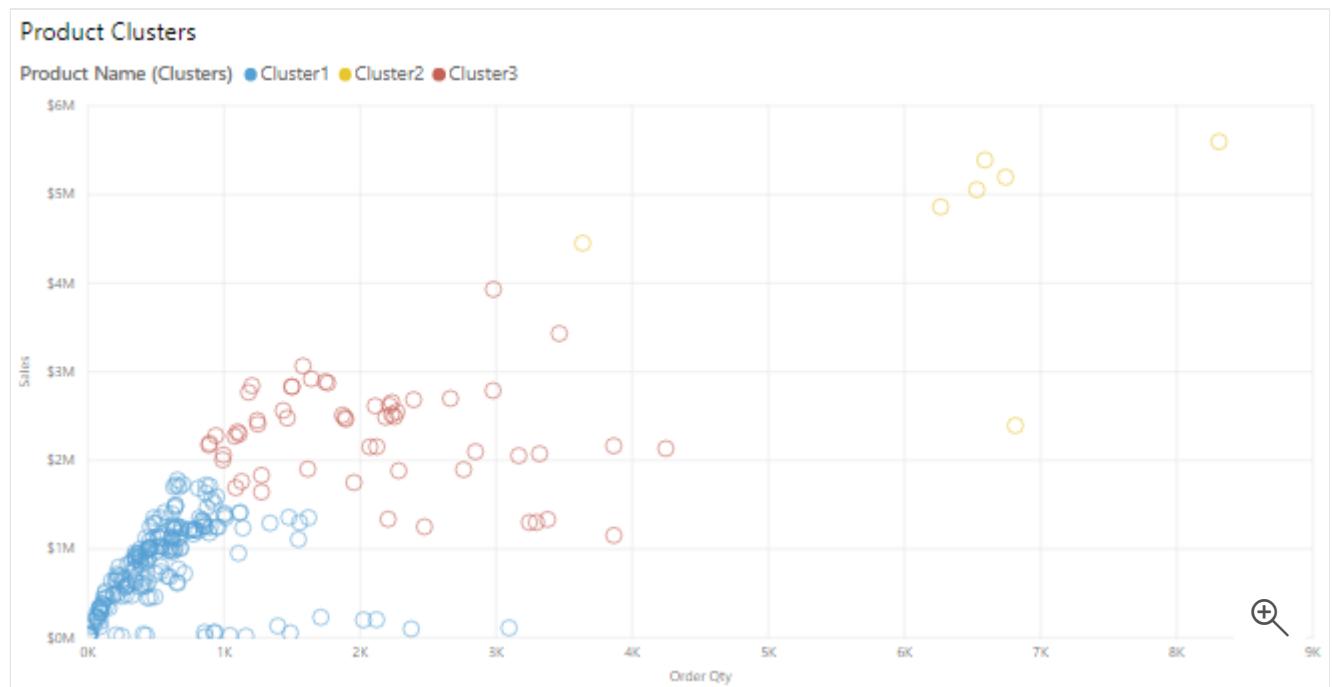


To apply clustering to your scatter chart, select **More options (...)** in the upper-right corner of the visual and then select **Automatically find clusters**.

On the **Clusters** window that displays, you can edit the default name, field, and description, if required. However, for this example, you want to change the number of clusters. The following image shows that the **Number of clusters** box is blank by default, which means that Power BI automatically finds the number of clusters that it determines as making the most sense with your data.

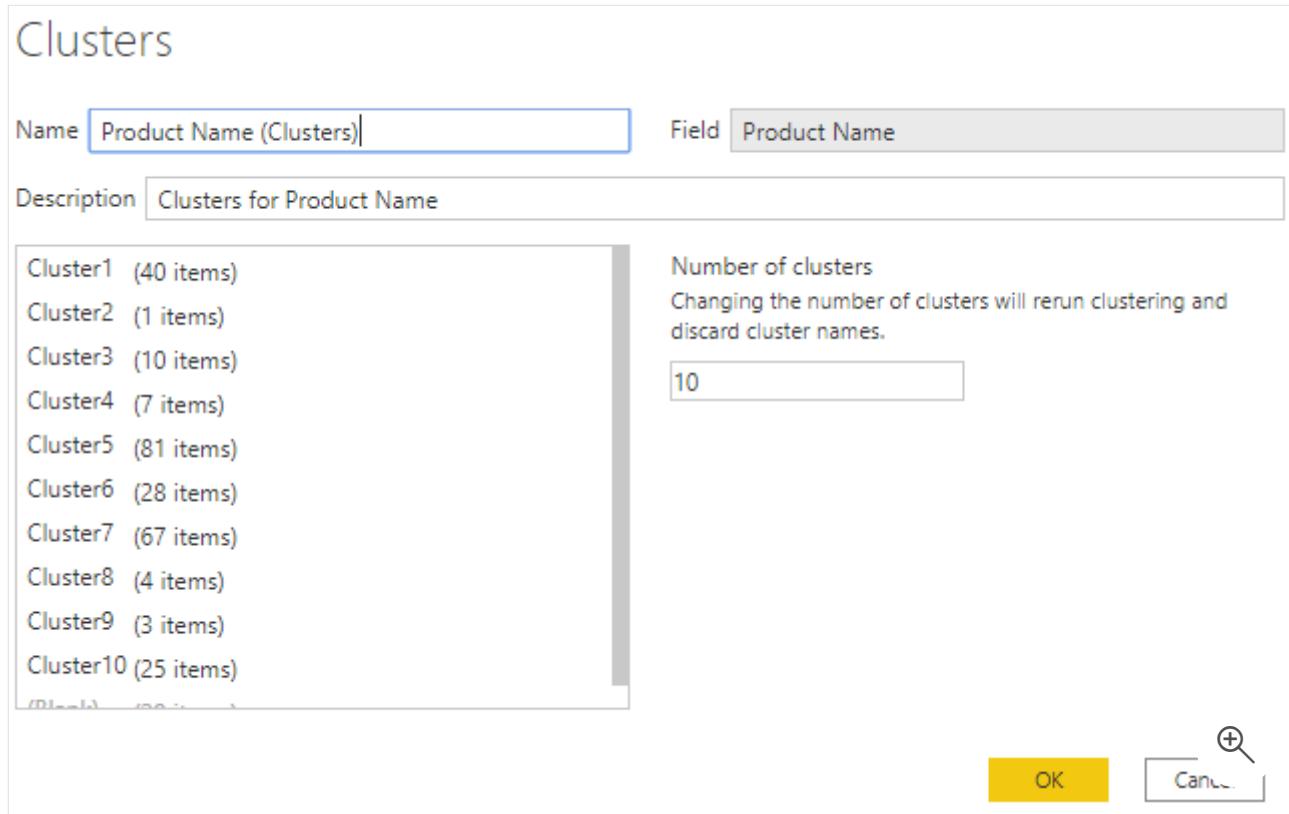


Enter the number of clusters that you want (3) into the box and then select **OK**. Power BI will run the clustering algorithm and create a new categorical field with the different cluster groups in it. Now, when you look at the visual, you can clearly see the clusters that are in your data and proceed to perform analysis on them.



The new cluster field is added to your scatter chart's **Legend** field well bucket, which you can now use as a source of cross-highlighting like any other **Legend** field. You can also find the new cluster field in your field list and use it in new visuals, just like any other field.

If you want to edit the cluster, right-click the cluster field and select **Edit clusters**.



In the preceding example, when you applied clustering to the scatter chart, you could only use two measures. If you want to find clusters by using more than two measures, you can use a table visual instead, add all the fields you want to use, and then run the clustering algorithm by using the same process.

Next unit: Conduct time series analysis

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How are we doing? ☆ ☆ ☆ ☆ ☆

✓ 100 XP



Conduct time series analysis

4 minutes

In 2004, Hans Rosling presented a Ted Talk titled, "The best stats you've ever seen." In that talk, Hans showed a video that allowed him to analyze data over time by playing an animated chart. The chart progressed, year-by-year, where viewers could watch how the longevity and family size moved over time for the entire world. This presentation initiated tremendous interest in the power of data visualization, particularly as it related to time series analysis.

Time series analysis involves analyzing a series of data in time order to identify meaningful information and trends and make predictions. The result of time series analysis is the best data that you can use for forecasting activities.

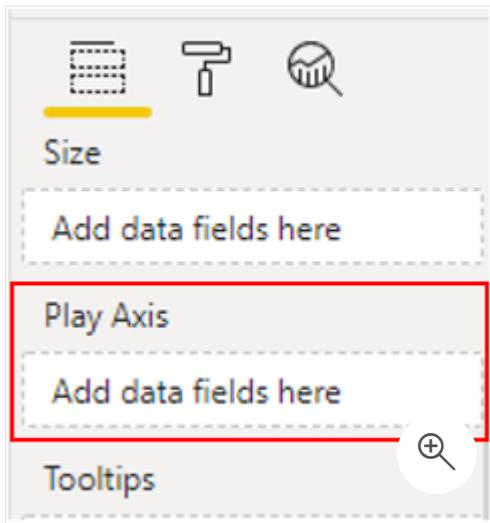
Time series analysis often involves the use of visuals such as Gantt charts, project planning, and stock movement datasets. In Power BI, you can use visuals to view how your data is progressing over time, which in turn allows you to make observations, such as if any major events disrupted your data.

To conduct a time series analysis in Power BI, you need to use a visualization type that is suitable for displaying trends and changes over time, such as a line chart, area chart, or scatter chart. You can also import a time series custom visual into Power BI Desktop from Microsoft AppSource. The following example uses a standard scatter chart.

In addition to the range of time series custom visuals, Microsoft AppSource has an animation custom visual called **Play Axis** that works like a dynamic slicer and is a compelling way to display time trends and patterns in your data without user interaction. This visual is similar to the one that Hans Rosling used in his original presentation and is used alongside the scatter chart in the following example.

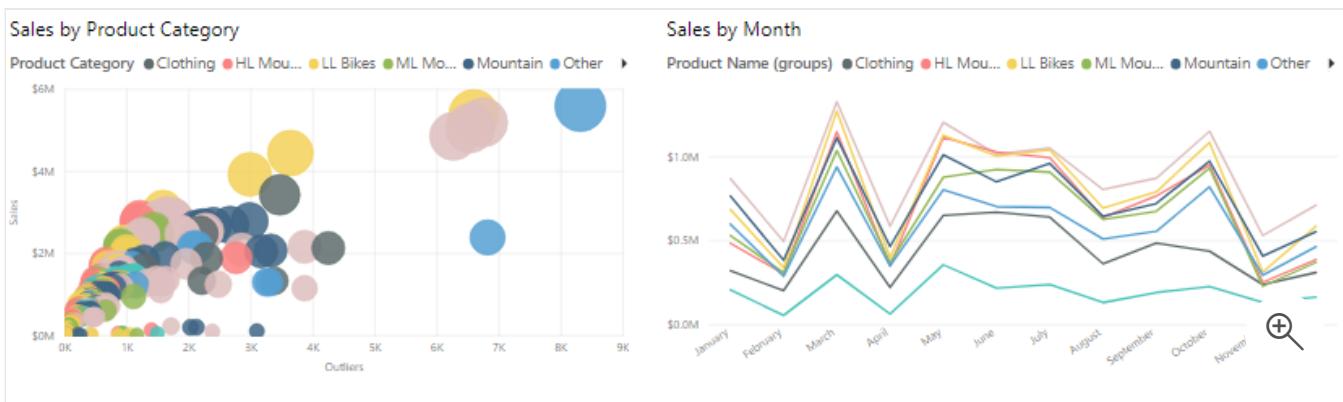
ⓘ Note

Some organizations prefer not to use custom visuals for security or other reasons. Before you import custom visuals, check with your organization to see if they are allowed or not. If they are not allowed, you can instead use the **Play Axis** visual that is available for scatter chart visualizations within Power BI Desktop because it has similar functionality.



In this example, you are developing a Sales report. The Sales team wants to study the quarterly sales trends and identify which models sell better, depending on the time of the season. You decide to use two visuals, a scatter chart and line chart, for the purpose of time series analysis, and then enhance those visuals with animation so the Sales team can see how the sales data changes over time.

You start by adding your visuals to the report page to show the sales data.



Next, you will import the animation custom visual to use with the visuals. In the **Visualizations** pane, select the **Get more visuals** icon and then select **Get more visuals**. On the **Power BI Visuals** window that displays, search for **play axis**, and then select the **Add** button for the **Play Axis (Dynamic Slicer)** visual.

Power BI Visuals

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Suggested for you ▾

Category

All

Advanced Analytics



Play Axis (Dynamic Slicer) ⚡

Working like a dynamic slicer, it animates your other power bi visuals without any user interaction.

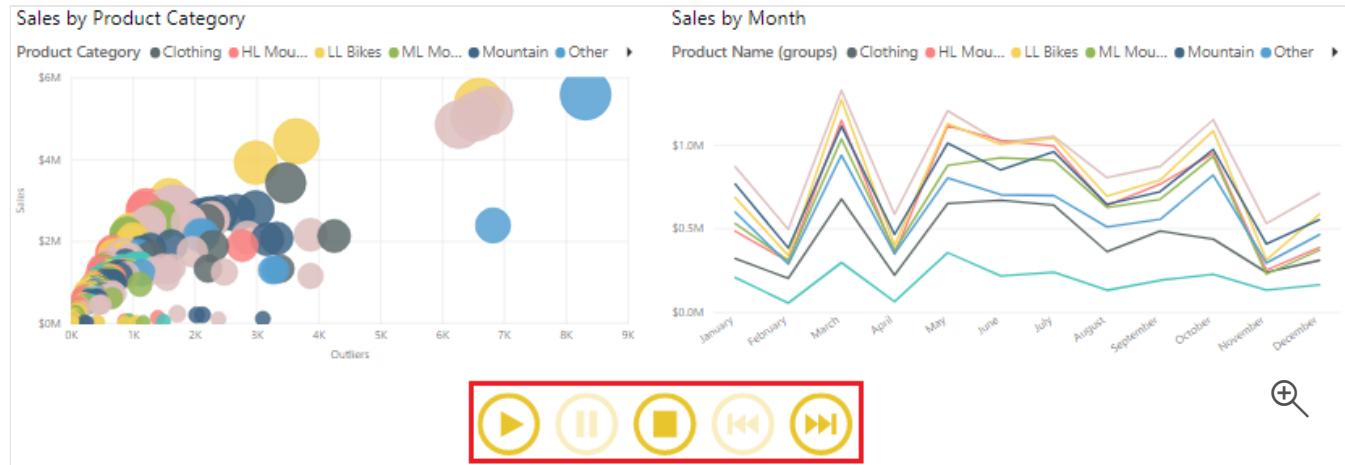
★★★★★

Add



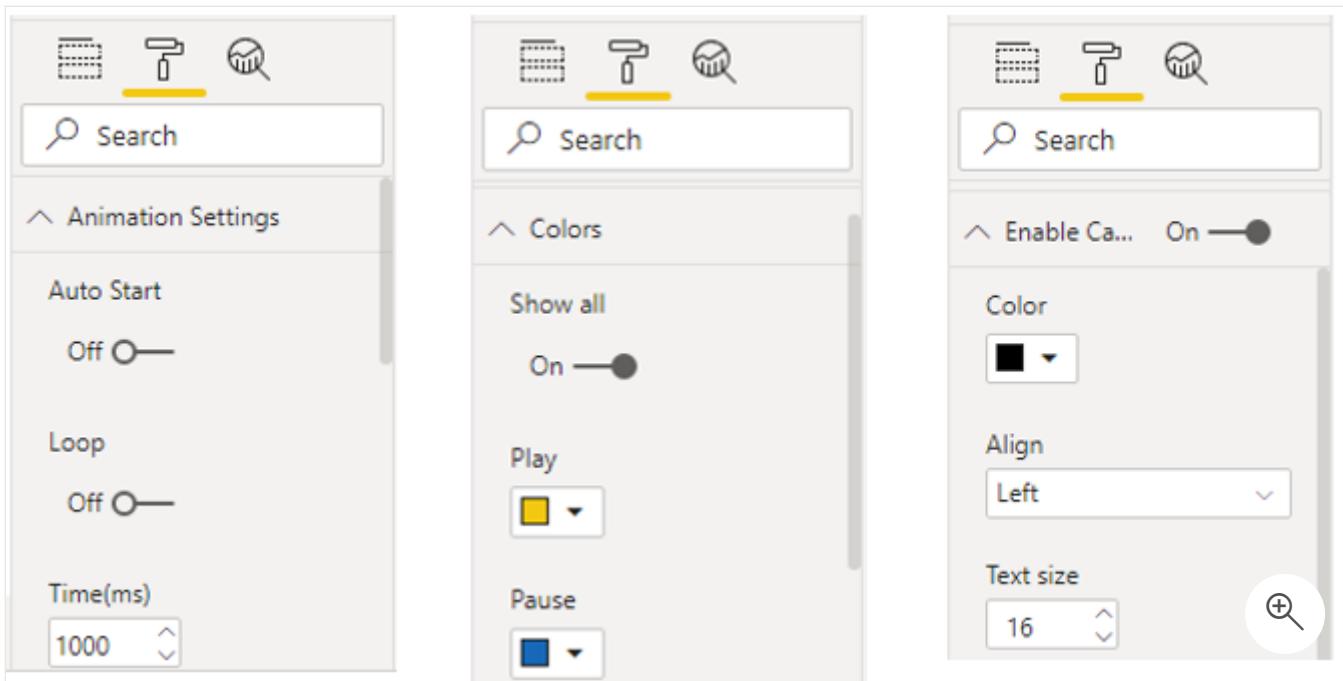
A message will display, stating that the visual was successfully imported. When you return to Power BI Desktop, you'll see the new **Play Axis** icon in the **Visualizations** pane. Select the page, and then select the **Play Axis** icon to add that visual to the page.

With the new visual selected, select the field (**Quarter**) that you want to use as the slicer in the **Play Axis** animation. Animation controls become available on the visual.

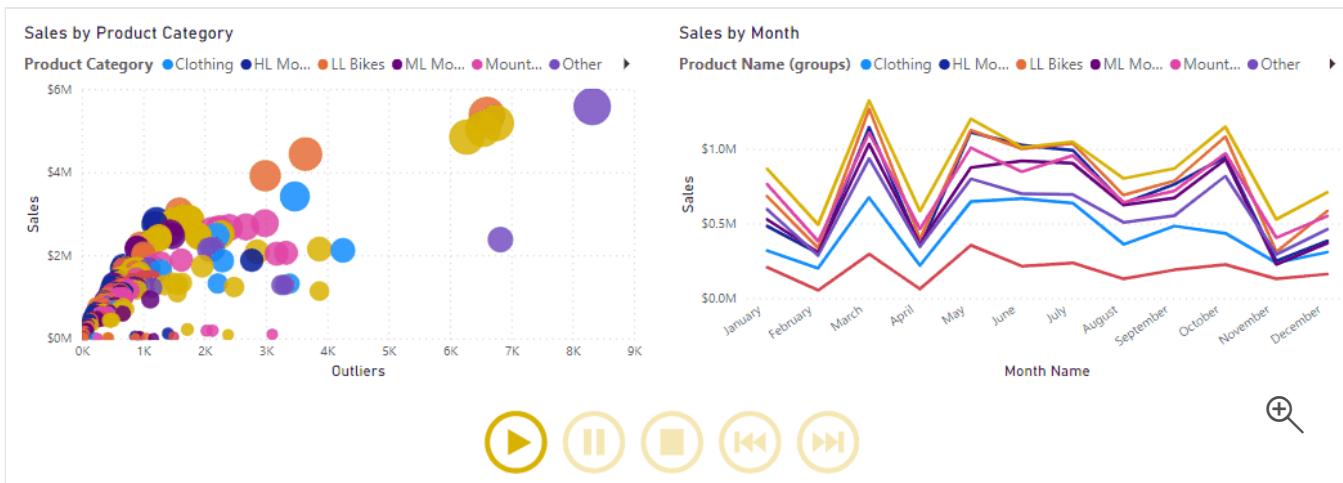


You can now resize and reposition the new visual and customize its formatting so that it's consistent with the other visuals on the page. Specific formatting options that you might want to use include:

- In the **Animation Settings** section, you can control the play functionality of the **Play Axis** visual, such as making the animation automatically start, continue looping, and then change the speed at which the animation occurs.
- In the **Colors** section, you can change the appearance of the **Play Axis** visual by adjusting its overall color, or selecting the **Show all** option, and then changing the color of each control button.
- The **Enable Caption On** section allows you to turn on/off the text that is displayed next to the visual or adjust the formatting of it.



When you have set up the **Play Axis** visual to meet your requirements, you are ready to use it with your other visuals. Select the **Play** button and then watch how the data in each visual on the page evolves over the time. You can use the control buttons to pause the animation, restart it, and so on.



Next unit: Use the Analyze feature

[Continue >](#)

How are we doing? ☆ ☆ ☆ ☆ ☆

✓ 100 XP



Use the Analyze feature

6 minutes

The **Analyze** feature provides you with additional analysis that is generated by Power BI for a selected data point. You might want to use this feature to determine if Power BI has found something that you haven't seen before, or if you want Power BI to give you a different insight into your data. This feature is particularly useful for analyzing why your data distribution looks the way that it does.

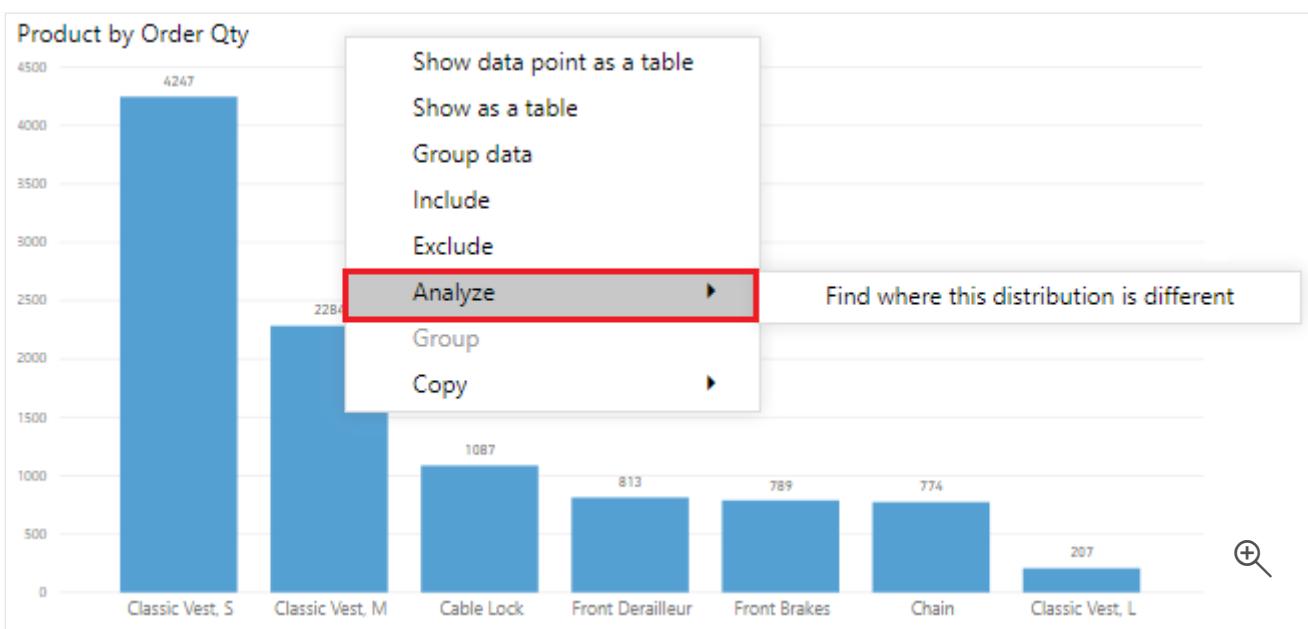
ⓘ Note

This feature does not work if you have non-numeric filters applied to your visual and/or if you have measure filters applied.

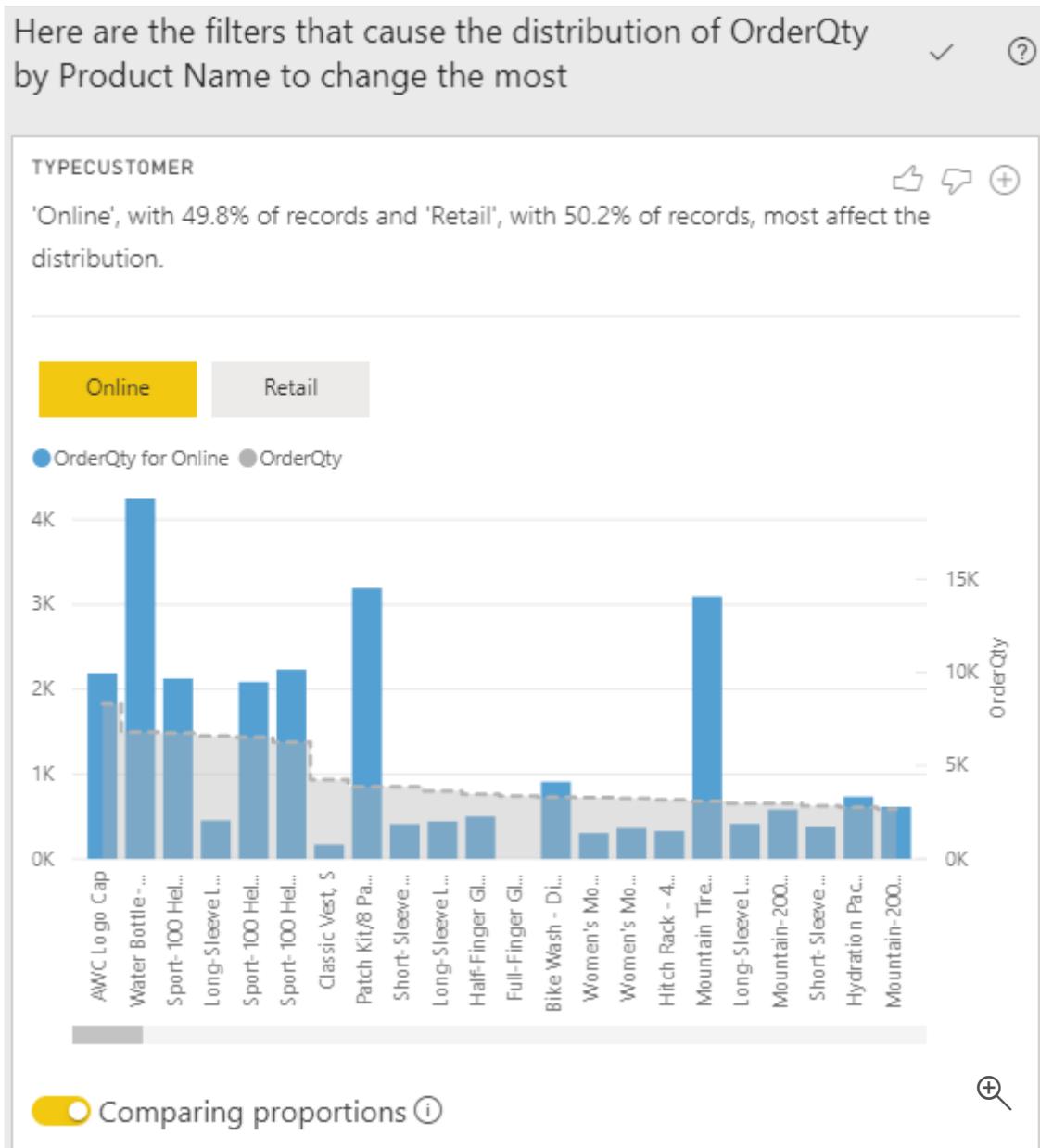
In this example, you are developing a report for the Customer Service team that deals with Help tickets. They want to analyze the ticketing data that is created online when a customer asks a question. You've created a preliminary visual to display data for tickets by location, but you're now curious about why the distribution of your data looks the way that it does.

Instead of exploring the data manually, you can use the **Analyze** feature to get fast, automated, insightful analysis of your data.

To use the **Analyze** feature, right-click a data point on the visual and then hover over the **Analyze** option to display two further options: **Explain the increase** and **Find where the distribution is different**. The options that are available will depend on the data point that you selected.



In the example below, you select the **Analyze** the increase option, and a window displays with a new visual, as illustrated in the following image.



If you find this analysis useful, you can add the new visual to your report so that other users can view it. Select the plus (+) icon in the upper-right corner of the visual to add it to your report.

For more information about the Analyze feature, see [Apply insights in Power BI Desktop to discover where distributions vary \(preview\)](#).

Next unit: Create what-if parameters

[Continue >](#)

How are we doing? 

Create what-if parameters

3 minutes

You can use *what-if* parameters to run scenarios and scenario-type analysis on your data. What-if parameters are powerful additions to your Power BI data models and reports because they enable you to look at historical data to analyze potential outcomes if a different scenario had occurred. Additionally, what-if parameters can help you look forward, to predict or forecast what could happen in the future.

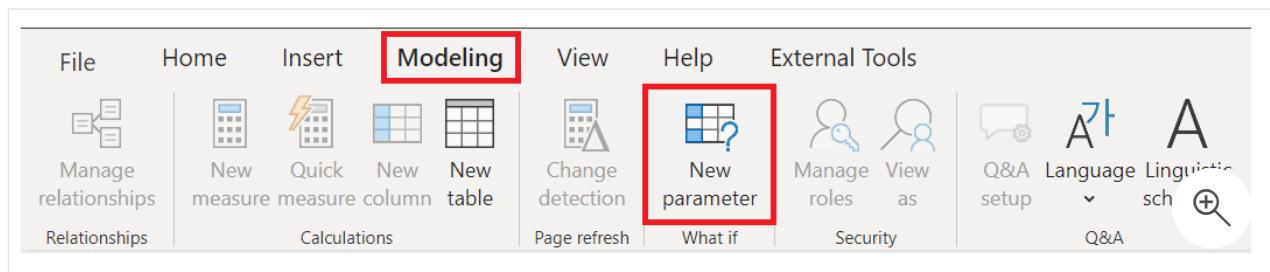
You can use what-if parameters in multiple situations, such as to determine the effect of increased sales to deeper discounts, or to let sales consultants see their compensation if they meet certain sales goals or percentages.

In the following example, you want to enable the Sales team to find out how much growth (percentage), from a sales perspective, that they need to make to earn USD 2 million gross sales each month.

Create a what-if parameter

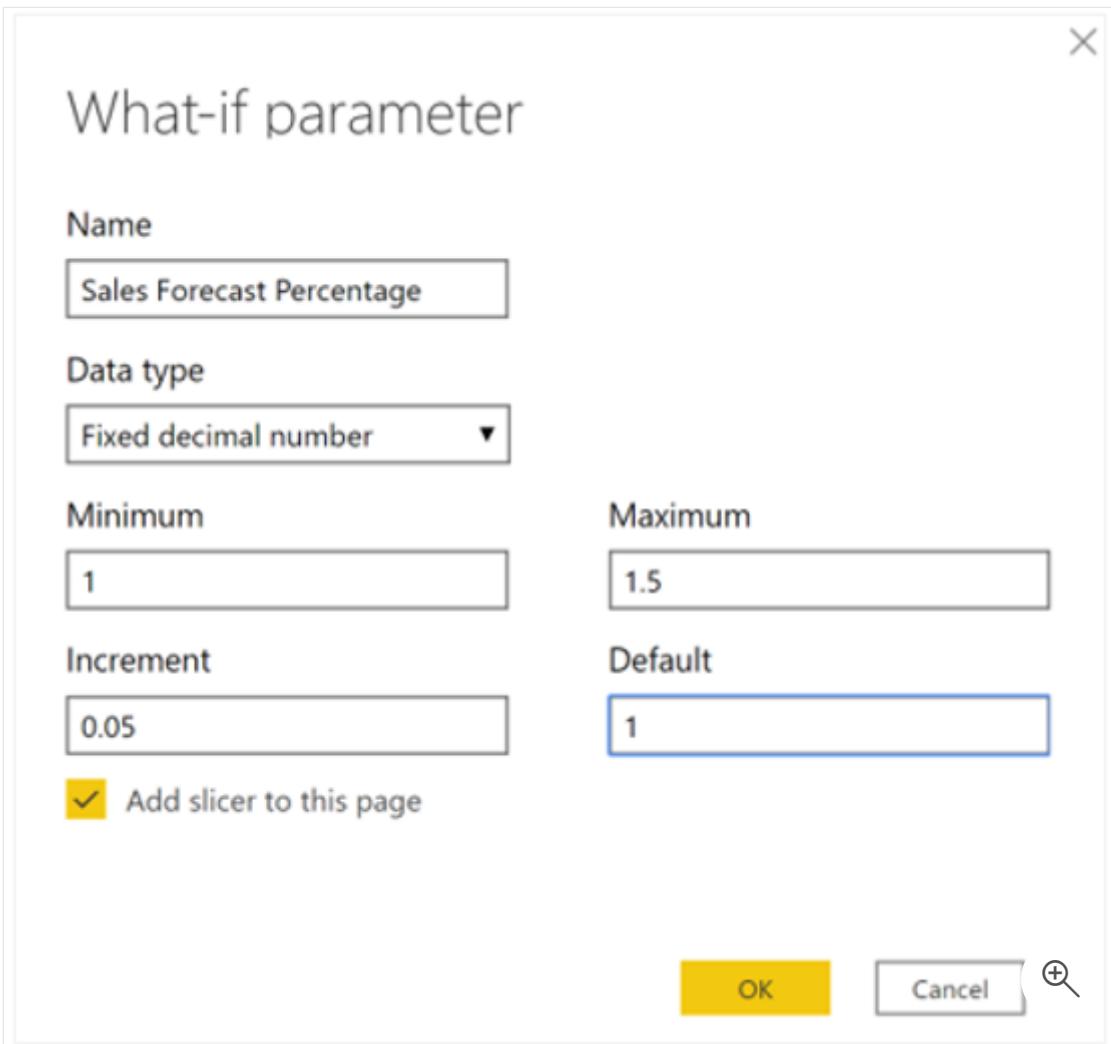
To create a what-if parameter, follow these steps:

1. Go to the **Modeling** tab and select **New Parameter**.



2. On the **What-if parameter** window, configure the new parameter.
3. For this example, change the parameter name to **Sales Forecast Percentage**.
4. Select **Fixed decimal number** as the **Data type** list because you are using currency in your forecast.
5. Set the **Minimum** value to **1**, the **Maximum** value to **1.50**, and the **Increment** value to **0.05**, which is how much the parameter will adjust when it is interacted with in a report.

6. Set the **Default** value to 1.00.
7. Leave the **Add slicer to this page** check box selected so that Power BI will automatically add a slicer with your what-if parameter onto the current report page.
8. Select **OK**.



(!) Note

For decimal numbers, make sure that you precede the value with a zero (as in 0.50 versus .50). Otherwise, the number won't validate and the **OK** button won't be selectable.

The new slicer visual will appear on the current report page. You can move the slider to see the numbers increase according to the settings that you applied. You should also see a new field for the Sales Forecast Percentage table in the Fields pane, and when you expand that field, the what-if parameter should be selected.

The screenshot shows the Power BI Fields pane. On the left, there is a visualizations section containing a slider control labeled "Sales Forecast Percentage" with the value set to 1.00. To the right of this is a "Fields" list. Under the "Visualizations" category, there is a node for "Sales Forecast Percentage" which has two children: "Sales Forecast Percentage" (selected, indicated by a yellow checkmark) and "Sales Forecast Percentage Value" (unchecked). Below this is another node for "fSales". A search bar at the top of the Fields pane contains the text "Search".

Similarly, you should see that a measure was also created. You can use this measure to visualize the current value of the what-if parameter.

This screenshot is similar to the previous one but focuses on the "Sales Forecast Percentage Value" measure. The slider value has been changed to 1.25. In the Fields pane, the "Sales Forecast Percentage" node now has two children: "Sales Forecast Percentage" (unchecked) and "Sales Forecast Percentage Value" (selected, indicated by a yellow checkmark). The "fSales" node remains the same. A red arrow points from the "Sales Forecast Percentage Value" label in the visualization area to the selected checkbox in the Fields pane.

After you have created a what-if parameter, the parameter and the measure will become part of your model; therefore, they will be available throughout the report and can be used on other report pages. Additionally, because the parameter and measure are part of the model, you can delete the slicer from the report page. If you want it back, you can drag the what-if parameter from the **Fields** list onto the canvas and then change the visual type to a slicer.

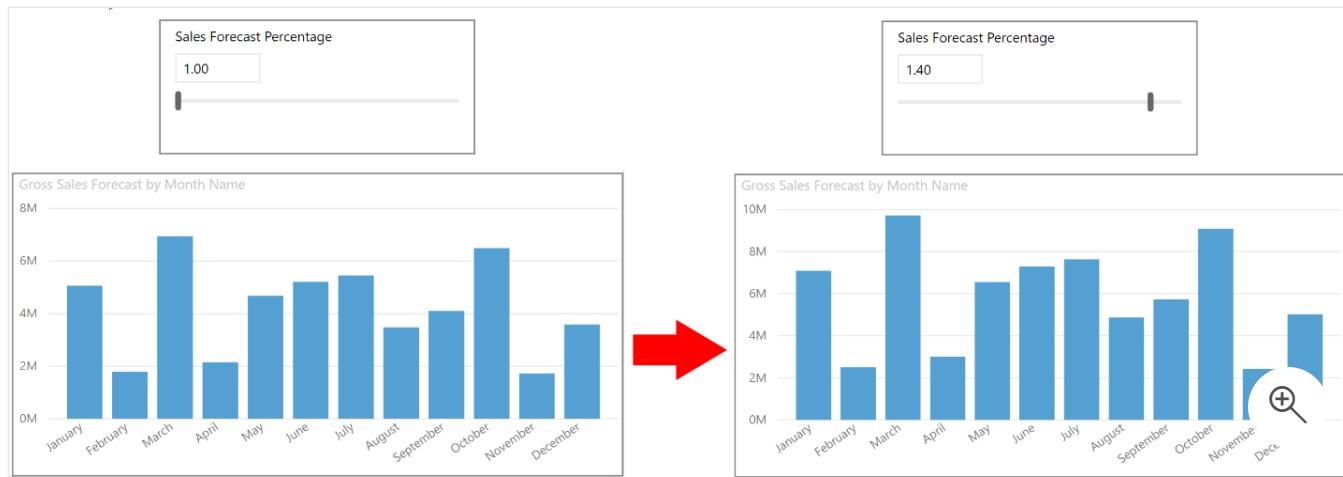
Use a what-if parameter

If you want to use the what-if parameter after you've created it, you will need to create a new measure whose value adjusts with the slider. You can create complex and unique measures that let your report users visualize the variable of your what-if parameter. However, to keep this example simple, the new measure is the total sales amount, with the forecast percentage applied, as illustrated in the following image.

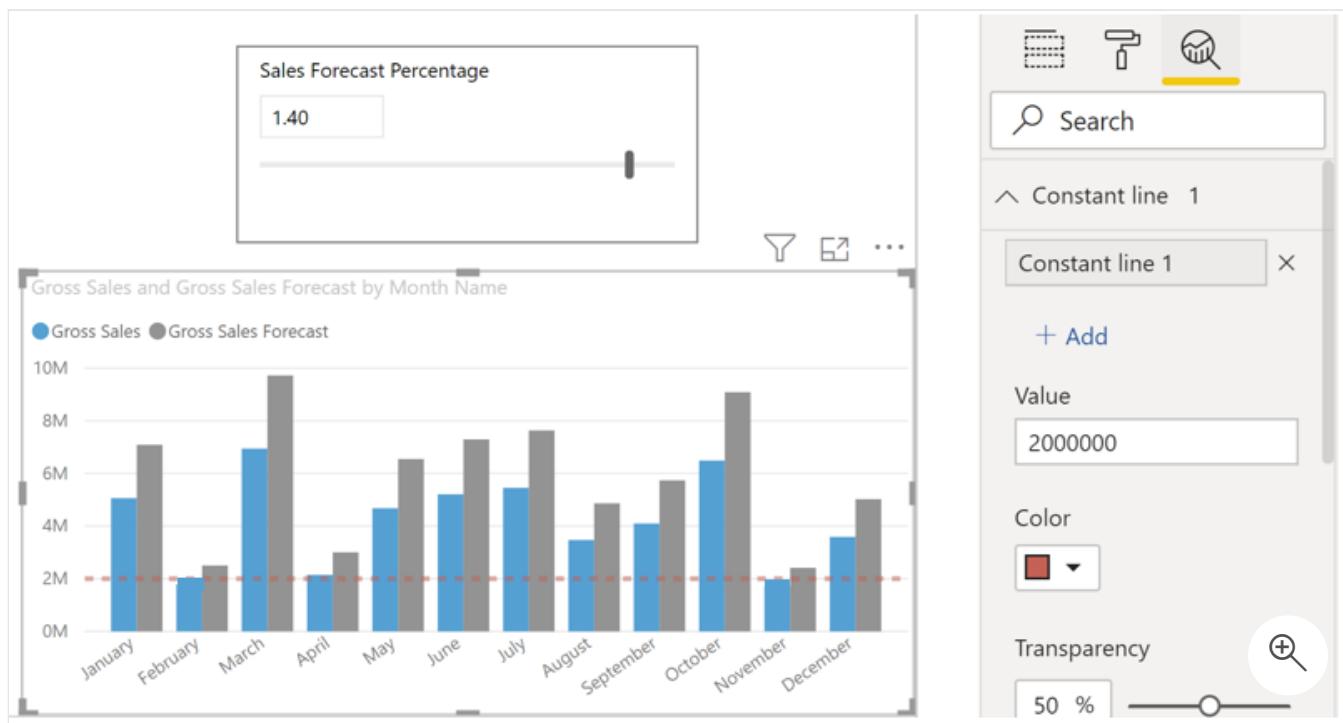
The screenshot shows the Power BI Measure editor. At the top, there are tabs for "Name" (set to "Gross Sales For..."), "Home table" (set to "fSales"), "Format", and "General". Below these are buttons for "X" and "✓" (checkmark). The main area contains the measure definition: "1 Gross Sales Forecast = [Gross Sales] * [Sales Forecast Percentage Value]". A status bar at the bottom indicates the formula is valid.

Next, you will create a clustered column chart with the MonthName field on the axis and the GrossSales and Gross Sales Forecast measures as the values.

Initially, the bars are similar; however, as you move the slider, notice that the **Gross Sales Forecast** column reflects the sales forecast percentage amount.



To enhance the visual, you can add a constant line so that you can clearly see how the organization is performing against a particular threshold or target. In this example, you will add a constant line with USD 2 million as the threshold value. Then, you will use the slider to find out what percentage of gross sales needs to increase by, each month, to reach that threshold. In the following image, the gross sales need to increase by 1.40 percent to reach the USD 2 million threshold.



Next unit: Use specialized visuals

100 XP

Use specialized visuals

13 minutes

Power BI includes several specialized visuals that provide a considerable interactive experience for report consumers. Often, these specialized visuals are called AI visuals because Power BI uses machine learning to discover and display insights from data. These visuals provide a simple way to deliver a rich and interactive experience to your report consumers.

The three main AI visuals are:

- Key influencers
- Decomposition tree
- Q&A

Tip

When adding an AI visual to your report, make sure that you size it to become as large as possible. That way, report consumers can fully interact with and explore the data in the visual.

Key influencers

The **Key influencers** visual helps report consumers understand the factors that drive a particular metric, like sales revenue. By using AI, Power BI will analyze the data, rank the factors that matter, and then present them as key influencers.

In the following example, the visual helps report consumers understand the important dimensions that contribute to won sales opportunities. According to the visual, when the discount rate increases by two percent, the likelihood of a won sales opportunity increases by a factor of 2.76.



Essentially, the **Key influencers** visual is many visuals inside one frame. When you select a key influencer, an adjacent visual will show a representation of the influencer as a comparison against the remainder of the data. Additionally, the **Key influencers** visual includes the **Top segments** view, which shows the highest-ranking segments that contribute to a particular metric.

The capabilities of the **Key influencers** visual are best described by following an example. For a demonstration of the **Key influencers** visual, watch the following video.

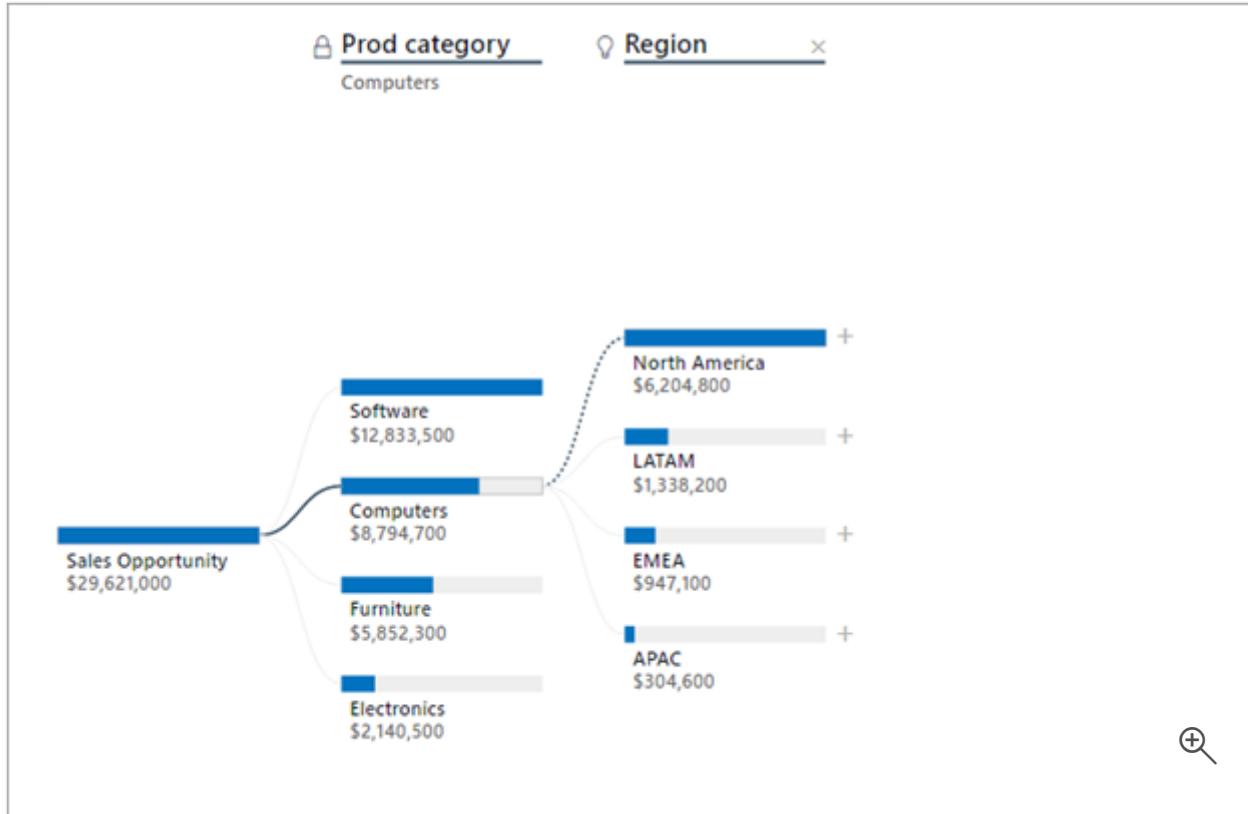
For more information, see [Create key influencers visualizations](#).

Decomposition tree

The **Decomposition Tree** visual helps report consumers visualize data across multiple dimensions. It automatically aggregates data and enables consumers to drill down into dimensions in any order. As a result, it's a valuable tool for ad hoc exploration and conducting root cause analysis. As an AI visual, a decomposition tree provides a guided exploration experience that helps by finding the next dimension for consumers to drill down into.

In the following example, a **Decomposition Tree** visual helps report consumers to understand the breakdown of sales opportunity revenue.

For a demonstration of the **Decomposition Tree** visual, watch the following video. The lock icon next to the **Prod Category** split means that the report author added the split and set it so that it can't be removed. Additionally, the light bulb icon next to the **Region** split means that the report consumer used an AI split to discover the best split.

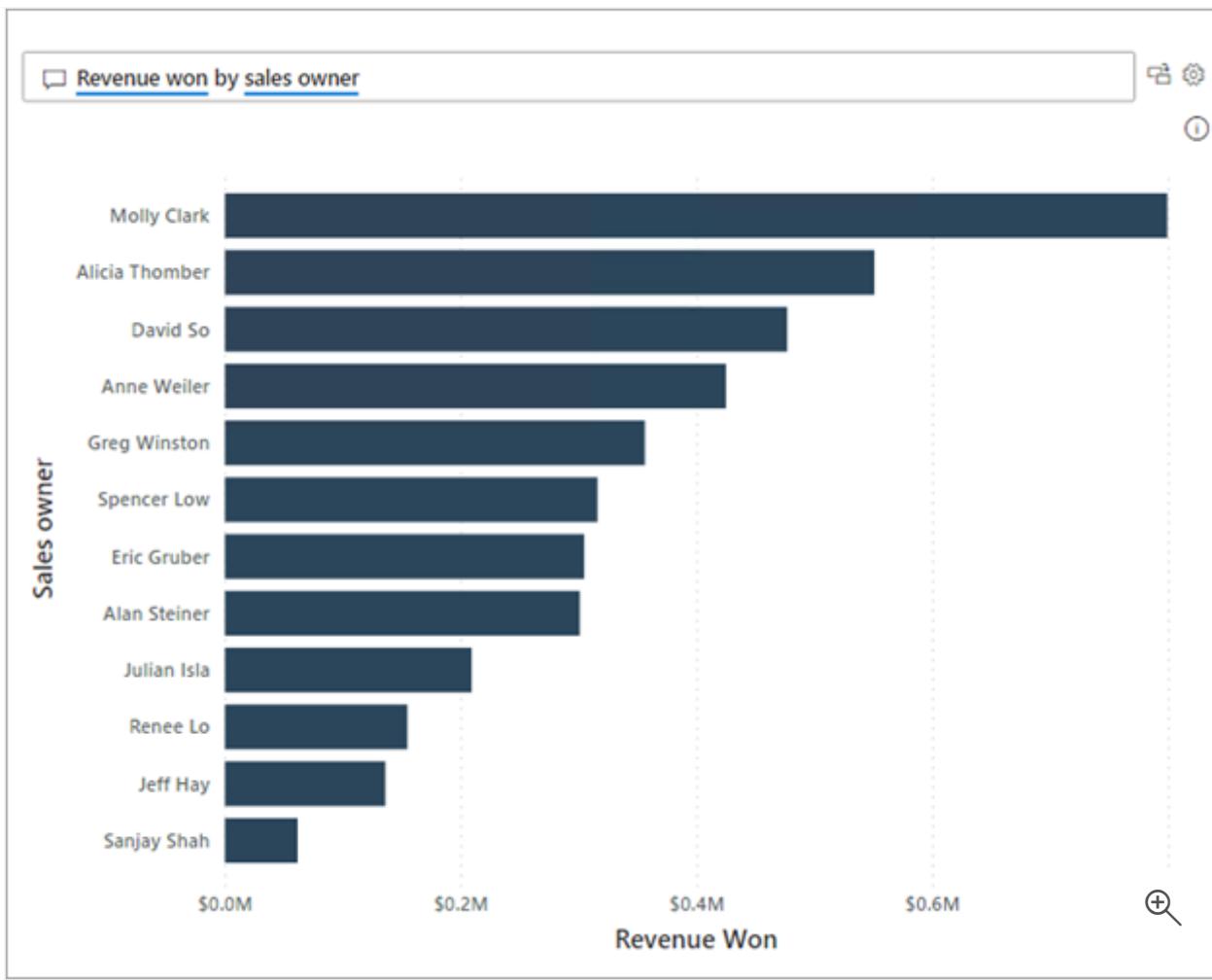


The capabilities of the **Decomposition Tree** visual are best described by following an example. For a demonstration of the **Decomposition Tree** visual, watch the following video.

For more information, see [Create and view decomposition tree visuals in Power BI](#).

Q&A

The **Q&A** visual allows report consumers to ask questions of their data and receive responses as data visualizations. Similar to how web search engines parse and understand complex search requests, report consumers can write natural language questions (in English).



Tip

To optimize the Q&A experience, ensure that the data field names are user-friendly. You can also enhance the data model with synonyms and terms. Additionally, you can hide fields, such as fields that are used in model relationships, to restrict their use in Q&A. You can also add suggested questions that become prompts in the Q&A visual.

For a demonstration of the Q&A visual, watch the following video.

For more information, see [Use Power BI Q&A to explore your data and create visuals](#).

Next unit: Exercise - Perform Advanced Analytics with AI Visuals

[Continue >](#)

✓ 200 XP



Check your knowledge

3 minutes

Answer the following questions to see what you've learned.

1. What Power BI feature can give an in-depth analysis of the distribution of data? *

- The Next Level of Hierarchy feature can give in-depth analysis because it will allow you to drill down for all subcategories and is not used to analyze the distribution.
- The Analyze feature allows a user to understand why the distribution looks the way that it does.

✓ The Analyze feature gives an in-depth analysis of the distribution of data.

- Only time series analysis can provide in-depth analysis on the data.

2. Where are time series charts located? *

- The filter pane is where all filters on visuals and pages are located.
- Time series charts can be imported from AppSource.

✓ Time series charts can be imported from AppSource.

- The fields pane is where all charts are located.

3. What visual should be used to display outliers? *

- The line chart is best-suited to display outliers.
- The scatter chart is best-suited to display outliers.

✓ The scatter chart displays outliers.

- The clustered column chart is best-suited to display outliers.

Practice Assessment for Exam PL-300: Microsoft Power BI Data Analyst

Question 12 of 50

You plan to use Power BI Desktop to analyze sales data for products sold by your company.

You need to create a DAX formula that will list 10 best-selling products sorted by their total sales.

Which DAX function should you use?

- MAXA
- MAXX
- RANKX
- TOPN

✓ This answer is correct.

The TOPN function returns Top N rows of the specified table, such as, for example, top 10 best-selling products sorted by their total sales. The MAXA function returns the largest value in a column. The MAXX function evaluates an expression for each row and returns the largest value. The RANKX function returns ranking of a number in a list of numbers for each row of a target table.

[Explore statistical summary - Training | Microsoft Learn](#)

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[Check Your Answer](#)

Practice Assessment for Exam PL-300: Microsoft Power BI Data Analyst

Question 13 of 50

You need to create a report in Power BI Desktop that will display the sales data of your company such that customers of a similar age will be grouped into clusters.

Which visual should you add to the report?

- card
- gauge
- scatter
- treemap

✓This answer is correct.

This answer is incorrect.

Creating a scatter visual is the first step of applying the clustering technique that groups data into clusters. Card, gauge, and treemap visuals do not support clustering.

[Apply clustering techniques - Training | Microsoft Learn](#)

Next >

[Check Your Answer](#)

Practice Assessment for Exam PL-300: Microsoft Power BI Data Analyst

Question 14 of 50

Which native AI visual helps explain correlations for a metric within the dataset?

Decomposition Tree visual

Key influencers visual

✓ This answer is correct.

Q&A visual

This answer is incorrect.

Smart Narrative visual

The Key influencers visual helps you understand correlated factors impacting a particular metric. The Q&A visual allows end-users to ask natural language questions to create AI generated charts based on the questions.

The Decomposition Tree visual lets you visualize data between multiple dimensions and drill down in any order. The Smart Narrative visual lets you combine natural language text with metrics from your model in sentence forms.
Find important factors with the Key influencers visual - Training | Microsoft Learn

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[Check Your Answer](#)

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Question 6 of 50

You implement the Q&A feature in a report, so users can get answers to their questions on their own.

You need to improve your Q&A search capabilities for end-users.

Which two configurations can you add? Each correct answer presents a complete solution.

Add a linguistic schema to the dataset.

✓ This answer is correct.

Add synonyms to model fields.

✓ This answer is correct.

Configure the dataset as a composite model.

Organize the dataset columns and measures into logical folders in the Fields pane.

Adding synonyms to model fields will help users search for them. For example, you can give a synonym of (Actuals) for the (Sales) measure. A linguistic schema describes terms and phrases that Q&A should understand for objects within a dataset, including parts of speech, synonyms, and phrasings that relate to that dataset. Composite models are not supported by Q&A today. Organizing fields by display folders will not impact Q&A search capabilities.

[Use the Q&A visual - Training | Microsoft Learn](#)

Next >

[Check Your Answer](#)